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FROM

the Commonwealth

SIXTY-FOURTH ANNUAL REPORT

OF THE

MASSACHUSETTS

STATE BOARD OF AGRICULTURE.

PART I.

REPORT OF SECRETARY AND OTHER OFFICERS.

1916.



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The Commonwealth

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STATE BOARD OF AGRICULTURE, 1917.

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LESTER H. HOWARD, *Commissioner of Animal Industry.*

F. WILLIAM RANE, *State Forester.*

WILFRID WHEELER, *Secretary of the Board.*

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	Term expires ¹
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EDWARD E. CHAPMAN of Ludlow,	1918
FRANK P. NEWKIRK of Easthampton,	1919

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<i>Amesbury and Salisbury (Agricultural and Horticultural),</i>	A. WILLIS BARTLETT of Salisbury,	1917
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<i>Blackstone Valley,</i>	JACOB A. WILLIAMS of Northbridge,	1917
<i>Deerfield Valley,</i>	STEPHEN W. HAWKES of Charlemont,	1919
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<i>Essex,</i>	FREDERICK A. RUSSELL of Methuen,	1919
<i>Franklin County,</i>	GEORGE E. TAYLOR, Jr., of Shelburne,	1918
<i>Hampshire,</i>	HOWARD A. PARSONS of Amherst (P. O. North Amherst),	1918
<i>Hampshire, Franklin and Hampden,</i>	CLARENCE E. HODGKINS of Northampton,	1917
<i>Highland,</i>	HARRY A. FORD of Dalton,	1919
<i>Hillside,</i>	MILTON S. HOWES of Cummington (P. O. Swift River),	1919
<i>Hingham (Agricultural and Horticultural),</i>	URBAN S. BATES of Hingham,	1917
<i>Hoosac Valley,</i>	NATHAN B. FLOOD of North Adams,	1917
<i>Housatonic,</i>	CHARLES W. FREEHAN of Great Barrington,	1917
<i>Lenox Horticultural,</i>	ALFRED H. WINGETT of Lenox,	1919
<i>Marshfield (Agricultural and Horticultural),</i>	WALTER H. FAUNCE of Kingston,	1917
<i>Martha's Vineyard,</i>	JAMES F. ADAMS of West Tisbury,	1918
<i>Massachusetts Horticultural,</i>	EDWARD B. WILDER of Dorchester,	1917
<i>Massachusetts Society for Promoting Agriculture,</i>	NATHANIEL I. BOWDITCH of Framingham,	1917
<i>Middlesex North,</i>	GEORGE W. TRULL of Tewksbury (P. O. Lowell, R. F. D.),	1919
<i>Middlesex South,</i>	JOHN J. ERWIN of Wayland,	1919
<i>Nantucket,</i>	HERBERT G. WORTH of Nantucket,	1917

¹ First Tuesday in December.

	Term expires ¹
<i>Oxford</i> , JOHN F. FREELAND of Sutton,	1918
<i>Plymouth County</i> , ERNEST LEACH of Bridgewater,	1919
<i>Quannapowitt</i> , CALVERT H. PLAYDON, D.V.S., of Read- ing,	1918
<i>West Taunton</i> , CHARLES I. KING of Taunton,	1919
<i>Weymouth (Agricultural and Horticultural)</i> , HOWARD H. JOY of Weymouth (P. O. South Weymouth),	1917
<i>Worcester</i> , CHARLES H. ELLSWORTH of Worcester,	1919
<i>Worcester North (Agricultural and Driv- ing Association)</i> , HENRY D. CLARK, D.V.S., of Fitchburg	1917
<i>Worcester Northwest (Agricultural and Mechanical)</i> , ALBERT ELLSWORTH of Athol,	1918
<i>Worcester South</i> , WILLIAM E. PATRICK of Warren,	1918
<i>Worcester County West</i> , LOUIS H. RUGGLES of Hardwick,	1919

**Member chosen by the Massachusetts Federation of County Leagues and Farm
Bureaus.**

L. L. RICHARDSON of Leominster, 1918

¹ First Tuesday in December.

The Commonwealth of Massachusetts.

SIXTY-FOURTH ANNUAL REPORT

OF THE

MASSACHUSETTS STATE BOARD OF AGRICULTURE.

PART I.

REPORT OF THE SECRETARY FOR THE YEAR 1916.

To the Senate and House of Representatives of the Commonwealth of Massachusetts.

A review of agriculture the country over reveals similar conditions in many sections. As a general rule, the spring was late and accompanied by damp, cold weather; serious floods in the south and middle west caused millions of dollars' damage to the crops of those sections, and had a direct bearing on the light yields reported. Seed germinated poorly and much reseeded had to be done, especially in the corn and cotton belts.

Yields in the great crops of the country show a decided reduction over 1915.

In spite of adverse conditions the farmers of the country have never been so seemingly prosperous. The continuation of the war in Europe has stimulated a demand for all kinds of American goods to such an extent that prices have risen in this country beyond anything since the civil war. With wheat nearing the \$2 mark, corn, \$1.25, cotton close to 20 cents a pound, and all other staples in proportion, farmers are the least likely to suffer by reduced crops. Another factor bearing upon the low crops has been the labor situation, for with all of our industries working at the maximum, labor ordinarily available for farmers during the crop season has been employed in other ways and at prices prohibitive to the average farmer. Planting

was, therefore, curtailed, and most farmers only planted areas which they could take care of themselves or with the help of their families. In some sections crops were ruined owing to the impossibility of getting labor to gather them. All of these factors have no doubt increased the cost of production, and while it may seem that the farmers have reaped large rewards this year, this factor of increased costs must be taken into consideration. With the labor outlook as it is, and with no immediate relief in sight, the question of the use of machinery in agriculture comes more prominently in view, and eliminating those sections near cities where there is a possibility of the use of shifting labor, the agriculture of the next few years is bound to change to those areas where the use of machinery is possible and where crops may be produced more cheaply. This will undoubtedly affect conditions in New England at least, where in our uplands and broken country there will be more opportunity to use rough land for the production of animals, and the larger, more open areas for crops.

One noticeable factor has entered into agriculture this year quite prominently, and that is that large industrial companies using agricultural products have gotten together with the idea of stimulating production. Particularly is this noticeable in the wool industry, where all factors engaged in this business are getting together for the mutual benefit of all concerned.

A large meeting is called, to be held in Chicago early in December, in order to get at some definite program, looking toward an increase in the production of sheep. Leather merchants and those interested in cotton are also alive to the problem of greater production, and are considering the question along lines similar to those interested in wool.

A continued increase of interest in agriculture on the part of people of small means has been noted, and the fact that the referendum of 1916, authorizing cities to establish agricultural and horticultural schools, was accepted by every city in this Commonwealth is a good indication of the general interest in this subject.

That great economic waste noted in my last report — namely, of the shipment of our soil fertility in the form of agricultural products, and with no adequate return — still goes

on in alarming proportion, and will undoubtedly continue so until we find ourselves face to face with the problem of practical conservation. In many sections of the country we are doing exactly what China has been doing for centuries, — taking crops from our soils, allowing erosion and returning nothing to those soils. The fact that there are over 2,600,000 tenant farmers in the country ought to be a severe indictment against us for our wasteful methods, for under no system does agriculture depreciate so rapidly as by that of the tenant farmer. The secretary had a good chance to note this in the south recently, where one farm which prior to the civil war produced 40 bushels of corn to the acre now produces less than 10; and of tobacco over 400 pounds, now less than 100.

The big questions confronting the agriculture of the country at this time, such as capital, labor, immigration, co-operation, markets, the elimination of waste in handling, storage and shipping, the lack of uniform laws between State and national governments, and the lack of a definite policy in agriculture, are being discussed on all sides. There is under discussion a national agricultural organization board whose work would be to assist in all kinds of agricultural organization. All of this goes to show that the people of the country are alive to the agricultural question.

The country as a whole is each year finding out that we can grow many of the things that we believed impossible of production here a few years ago. The production of figs, dates, olives, certain varieties of other semi-tropical fruits, as well as vegetables, is an example of this. The shutting off of the imported supplies of certain agricultural products has turned our attention toward producing these crops in our own country; then, too, demand has increased so rapidly that it must be met by trying out all kinds of new things.

Education in agriculture has reached the stage where not only agricultural colleges but special schools of agriculture are being established, as well as courses in high schools, and even in the field of private endeavor agricultural schools are being established. It is interesting to note that our colleges and universities are in many cases adapting their courses to some of the agricultural problems.

MASSACHUSETTS CROP CONDITIONS IN 1916.

Certainly our farmers never faced such a difficult situation as during the year of 1916. Winter continued late so that in many sections of the State snow lay on the ground until early in April. This was followed by cold, damp weather during the late spring and summer. Not only was the rainfall in April and May well above the average, being about $3\frac{1}{2}$ inches in each of those months, but the rainfall in July, usually one of our driest months, reached the unprecedented total of 5.13 inches. This, of course, made haying conditions intolerable. The heavy precipitation continued through August, making the summer, as a whole, one of the wettest which we have ever seen, as the following rainfall figures will show: April, 3.32 inches; May, 3.85; June, 2.94; July, 5.13; August, 2.75; September, 3.53; total, 21.52.

Our State as a whole planted much less than the usual acreage of crops; particularly was this so on the lower lands, where the continued wet weather of the late spring made it impossible to work them at all. Many corn fields usually planted in late May or early June were too wet on July 1 and so only were planted to late crops.

Seed started slowly and was often replanted two or three times, but during the late summer, owing to more favorable weather conditions, the crops, as a rule, turned out better than the early season promised. The high price of many seeds was responsible for curtailing the planting of some crops, such as potatoes, beans and peas.

Grass came through the winter well and got a good start except on low ground where it was flooded until late in spring. Everything pointed to a good crop, but much hay was ruined by the heavy rains during cutting season, and much of the first crop was not cut until late August. Where early cutting was done, however, very heavy second crops were harvested. Prices are quoted a little lower than last year, the figures being \$20 for 1916 against \$22.70 for 1915. Massachusetts has the highest figure reported for New England, while the country at large is only quoted at \$10.68.

There has been a decided falling off in corn this year, the

total figures for the State being 1,760,000 bushels as against 2,304,000 in 1915; but a greatly increased price somewhat offset the low crop, the price being \$1.10 in 1916 and 82 cents in 1915.

Potatoes were in most cases planted very late, and, largely owing to the lack of fertilizer, were a light crop. In some sections blight injured them materially, while in others rot set in late in summer. Seed also was very high and restricted planting. The crop this year was 2,180,000 bushels, with a price of \$1.47; last year, 3,120,000 bushels, with a price of 92 cents.

It is to be noted that we are steadily declining in the production of potatoes,—from over 4,000,000 bushels in 1914 to about half that in 1916. This is a very serious drop, particularly so in that prices have ruled high in these three years.

Market-garden crops were fairly abundant and of good quality, although varying much with the location. Early crops out of doors were more or less injured by too much rain. Summer prices were high, and crops of all kinds sold well above the average; particularly was this so for beans, cabbage, lettuce, cucumbers, root crops and sweet corn.

Greenhouse crops were in large demand, and this fall, for the first time in years, lettuce has sold at a profit. Celery, the great late out-of-door crop, has practically all been housed, and is in fair condition, although it should have had a longer growing season. Prices for this crop are good.

Tomatoes were scarce and very high, as were also peppers and squash. Asparagus was fair and sold well. An estimate of the market-garden crops of the State shows that approximately \$10,000,000 worth were grown this year.

The apple bloom of the spring gave abundant promise of a large crop, but cold, damp weather immediately followed, and there was a poor set of fruit in many places, and the continued bad weather conditions made spraying almost impossible. Spray mixtures, so often used with success in other years, either burnt the foliage this season or russeted the fruit, so that many fine orchards were partially ruined. No very satisfactory explanation of the cause of this could be made except that owing to atmospheric conditions the sulphur and arsenic in the spray mixtures became more soluble and burnt before they could dry. Spraying

during the middle of the summer was practically impossible, and in consequence much fruit was affected with what is known as the "Brooks spot,"—a small black fungous growth spotting the apples, particularly at the calyx end. This condition, while not seriously affecting the quality of the fruit, reduces the value of the apples considerably, and there were few fortunate places in the State which escaped the trouble. This condition also prevailed throughout New England. "Baldwin spot" has also been abundant, and all of these troubles have seriously reduced the number of apples suitable for storage.

Cold-storage apple holdings throughout the Nation are very much smaller than in 1915. In fact, only about 56 per cent of the quantity stored last year has been stored in 1916. In the New England States the proportion was even lower, the 1916 figures being 40 per cent of the 1915. It is evident from these figures that good apples will be exceptionally high in the spring of 1917.

The demand for apples abroad has continued strong, and in spite of heavy ocean freights large quantities have been shipped and good prices realized.

There seems to be a continued planting of apples in the State, but not on as large a scale as in the past few years. The feeling that over planting is likely to cause low prices in the near future is prevalent in many places, and has had much to do with curtailing planting.

Orchard fruits, other than apples, were particularly light; some peach sections had no crop at all, while others, particularly in Worcester County, were fair. Prices were good. Pears in the eastern part of the State were a fair crop and prices ruled high.

Small fruits were abundant in most cases, especially so with strawberries, but as rain set in badly during the picking season, and as the fruit of many other sections ripened at the same time as Massachusetts berries, prices were very low toward the end of the season.

Cranberries were a little less than last year, the crop being injured on some bogs by excessive rain, and on others by insects. Prices are good, fancies being quoted now at \$8 to \$10, and other grades at \$6 to \$8.

The tobacco crop this year was planted and harvested under

fair weather conditions, and on the whole was good. Shade-grown tobacco has increased slightly this year, as has also the acreage for open-air tobacco.

Onions, of which there is usually a very large acreage in the State, decreased somewhat this year, owing especially to bad weather conditions at planting time. The crop was only fair in size, but good in quality, and prices have ruled high.

THE BLUEBERRY.

Very much interest seems to be taken in the humble blueberry. The government, through Professor Covill, has been at work, by breeding, to bring the blueberry up to a higher state of cultivation. Judging from results in the improvement of the size of the fruit, if an easy method of propagation can be found, the blueberry bids fair to become one of our easily cultivated fruits. Experiments in New Jersey show remarkable results as to yield and profit.

This State, with quantities of natural blueberry soil, should consider this problem as one of the most important in relation to much of our wild lands. Certain areas with acid soils would require a great deal of capital to develop them for other crops, but planted to the blueberry could easily be made a source of much profit. Even now with very little work of clearing out brush and weed trees, the blueberry may be made a profitable business on much of our land. As yet, very few figures are obtainable as to the actual value of this crop in this State, but instances have been noted where families have sold as high as \$500 worth of the fruit this season, and still quantities of the crop go to waste.

CO-OPERATION.

In these days of high prices for all food products there seems to be a strong desire on the part of consumers to co-operate for their mutual benefit. In times of low prices for farm products there is always the cry from the farmer to co-operate in order to cut costs and get more closely in touch with the market, hoping thereby to get a larger per cent of the consumer's dollar. It seems strange that both these great interests cannot see the mutual benefit at all times of some co-operative plan

which will better distribute food when it is cheap and conserve it during periods of scarcity. One side gains something at the expense of the other, no matter whether prices are high or low. The side which gains the most in the long run is that side which can stand the losses best. Generally speaking, this latter is the farmer who can live even though his crops may not return him a profit for a number of years. Under present conditions these two great forces are bound to be in conflict most of the time, the one blaming the other for adverse conditions. Just at present it is the consumer who can see nothing good in the producer, and all sorts of stories are prevalent from the farmer destroying his crops in order to keep up prices to the farmers combining to limit production. It is now the consumer who would co-operate. Little do consumers, as a rule, realize the cost of producing food products. To most of them the farmer's task is a simple one, — just planting the seed and harvesting the crop, — they not realizing the long struggle to get a farm on a paying basis, and the long hours of labor under all kinds of weather conditions. Little do they realize that if the farmer were limited to the eight-hour day food prices would be prohibitive. Before there can be any real co-operation there has got to be a more sympathetic understanding between both sides of this great controversy. Possibly it is the business of the farmer to inform the consumer more about his business. Certainly the farmer should know more about the conditions which prevail in the cities, and to this end might it not be possible to arrange mass meetings to discuss this question and get a full expression of the whole vexed problem?

There have been many requests made upon the Board this year for help in co-operative work. The secretary has spoken to several meetings along these lines, and while many persons are very glad to inform themselves there seems to be very little desire to go any further. Real work is more often undertaken by persons of foreign birth who have come in contact with the same sort of work in their own country. It should, however, be borne in mind that the process of co-operation is bound to be slow, and only as economic pressure is brought to bear will the movement gain much headway.

RURAL CREDITS.

The law passed by the State in 1914, authorizing the incorporation of farmland banks, has not been made use of, although one charter has been granted to a Springfield group to establish a bank in that section.

The passage of the national rural credits law has in many ways taken the incentive out of our people to make use of their own law, though the latter, in the opinion of the secretary, much better fits the needs of our State.

The national law establishes twelve regional banks, creates the machinery to run them, requires capital to the extent of \$750,000 for each bank, and demands that the borrowers organize themselves into groups of at least ten, whose total borrowings shall be at least \$20,000. Appraisal of the property is made in a very cumbersome way, and the delays incident to obtaining a loan and the publicity attached to this system would in many sections of the country have a very bad effect on the free use of these banks.

The law also allows for the establishment of joint stock banks under certain restrictions, and in many cases these would be in competition with the regional banks, and as the borrowing may be made more easily from the joint stock bank there would be little inducement for the farmer to borrow from the other.

There are several good features to the national law, for example, the amortization system; but with both the State and national laws new machinery is necessary before any good may come to the farmer. What we need here in this State more than any other one thing to develop agriculture is capital, and it would seem that if savings banks, trust companies and co-operative banks had a little wider latitude in the lending of money, and could issue bonds on the mortgages held, and provide for their retirement by the amortization plan, no new machinery would be needed. A splendid start in this direction has been made by a Plymouth County bank, which now has a well-organized farm loan department. This department keeps two regular men in the field who are familiar with agricultural conditions in the county, and who actually urge farmers to borrow money from the bank where they see that the farmer is responsible and could do better with more capital. This work

has now been taken up by a Springfield Trust Company, and it certainly should be encouraged. If we could get one or two banks doing this work in each county of the State there would be no necessity for special farmland banks.

THE NATIONAL DAIRY SHOW AND EASTERN STATES AGRICULTURAL AND INDUSTRIAL EXPOSITION. .

Seldom in the history of the agriculture of this country has such an achievement as that undertaken by the business men of Springfield been accomplished. Less than one year ago, guided by a group of business men, Springfield undertook to establish a large agricultural and industrial exposition in that city, and, realizing the importance of a good send-off, they were able to get the National Dairy Show to come east for the first time since its incorporation.

Money, grounds, buildings, etc., had to be arranged for in a short space of time, but through the energy and enterprise of the leaders, over \$500,000 was raised. Land was purchased, and in spite of obstacles, such as high material cost, labor troubles and bad weather, the buildings were erected and grounds put in order for the opening of the National Dairy Show on October 12.

The general plan of grounds, placing of the buildings, their decoration and arrangement, are very harmonious, and have an ease of access, convenience and general utility seldom found at such places. Special emphasis in the arrangement has been laid on the agricultural side of the whole matter, and it is to be hoped that this will continue. At this time not all of the buildings are completed, but plans are under way for their completion in the near future. The present group comprises the central building or coliseum, with the stock and machinery buildings on either side, the woman's building, horse barns and several smaller structures.

Too much credit cannot be given to those men who have given freely of their time and money in furthering this enterprise, believing as they do that in bringing the dairy show to New England they will be doing much in creating a new interest in this industry.

The dairy show itself opened under most favorable conditions

of weather and season. Every bit of space was taken in the machinery building, with one of the most remarkable exhibits of dairy machinery ever brought together in one place.

The cattle, of which there were nearly 1,000 in the following breeds, — Jersey, Ayrshire, Brown Swiss, Holstein and Guernsey, — were assembled from all over the country, and were certainly a splendid lot of animals. It was an inspiration to go among them and see to what extent careful selection and breeding has been carried. It is to be hoped that the lesson taught at this dairy show will impress itself upon all those interested in dairying to the extent that more pure-bred sires will be used by our farmers; and it seems fitting at this time to impress upon our Legislature that no greater service to the dairying interests of the State can be rendered than by the placing of pure-bred sires at many convenient places for use by those farmers who will avail themselves of them. The lesson of the dairy show to Massachusetts should be larger production and the elimination of the unproductive cow.

The Board through its executive committee was represented at the show on October 18, and had the honor of escorting the Governor and his party, together with Ex-President Taft, to the show on that date. Many other members of the Board were present on the same day.

EXHIBITION OF THE BOARD AT THE DAIRY SHOW.

Early in September the management of the dairy show requested the different State departments of agriculture in New England to make exhibits in connection with the exposition. Several meetings were held at which representatives of the Board were present, and it was decided to go ahead with the plan.

As no buildings were available, an appeal was made to the Governor and Council for money to erect a building and place an exhibit. Twenty-five hundred dollars was appropriated from the appropriation for "extraordinary expenditures," and of this sum \$1,500 was used to erect the building. Plans were not finally decided upon until about three weeks before the opening of the show, when it was decided to put up a small exhibit of the best quality crops in which our State excels.

Apples, market-garden vegetables, corn, tobacco, onions, potatoes, cranberries, etc., were featured prominently. Added to this were exhibits by the Dairy Bureau, Nursery Inspector, Apiary Inspector, Ornithologist, Alfalfa Growers' Association, State Forester, Apple Grading Service and of the Board itself.

Mr. A. W. Lombard was placed in charge of the exhibit, and the success of the show is largely due to his efforts.

Special credit is due to all who took part in making the show a success, and the Board wishes at this time to thank the Governor and Council for making the appropriation which made the show possible. The exhibition was attended by large numbers of people, and from all quarters nothing but favorable comment was received. The building was far too small to accommodate the material which was received, but by making use of all available space the exhibit was made attractive.

The Board's exhibit at Springfield has raised the question very much more prominently than ever before of the undertaking of a more definite system of displays, not alone in this State but in others where Massachusetts' products might be shown, and a general advertising campaign started looking toward bringing more farmers to our State, together with advertising the wider use of all our agricultural products. We certainly can make a splendid showing, and as we have the products and the land to grow more we should not neglect the opportunity to talk about them. Such places as the large exhibitions in Madison Square Garden, New York, the Great Land and Market Show of Chicago, as well as many smaller cities of the country, should be visited.

THE TRACTOR FOR MASSACHUSETTS.

Much has been said and written lately in relation to the use of traction engines in agriculture. This Board, at its summer meetings the past four or five years, has had demonstrations with several types of tractors, especially designed to do farm work. With the increased price of horses and the cost of keeping them there seems to be an increased demand for a type of tractor which will do the work of a pair of horses on a farm, and yet be within the reach of the farmer's pocketbook. This

machine should be able to plow, harrow, haul loads on roads and fields, handle harvesting machinery both in the field and stationary, burn cheap fuel and work under the trying conditions of grade and stones found on most New England farms. Many of the tractors now on the market have some of these qualifications and a few have a combination of them. There are none at present which seem to have them all, but judging by the strides which have been made in the last five years the day is not far distant when we shall have a machine which will come up to the requirements of the small farmer.

The type of machine at the present time which comes nearest filling the requirements is too expensive for the average farmer, to purchase, except in some co-operative way. This type, the Caterpillar, has been tried out under the most exacting conditions of soils, climate and grade, and it seems splendidly adapted to the uses of the small New England farm. This machine, and there are several different makes at work in the State, seems to go a long way toward solving the problem of clearing land of trees, rocks and stumps, and of ditching and hauling loads. It seems to be suited to the general work of the farm in fully as many ways as a tractor could be expected to be in farm work.

That we are going to need the tractor in agriculture is apparent, and to those who are thinking of purchasing, a word of caution should be given. Remember these machines are perishable. The depreciation on all types is great, and especially so on the light machines which are expected to do heavy work. They require skill in handling and care, and unless a farm has work enough to keep one busy a good deal of the time the purchase of such a machine would hardly be considered a good investment. So far as the figures are obtainable at present there are over 100 tractors at work in the State.

THE MILK SITUATION.

The past year has been marked by much agitation and some violence on the part of the farmers for an increased price for their milk throughout the whole country. Chicago was close to a milk famine in June. New York went through one of the worst milk strikes known in its history, and from this strike the

farmers have realized a small increase, — not entirely satisfactory, but better than under the old conditions.

The situation in Boston, where the milk comes from a wider territory than either New York or Chicago, was not so tense, principally because the organization among the milk producers was not so strong. The agitation, however, served its purpose somewhat in that an increased price was granted to most of the producers. The smaller cities and towns of this State have gone through similar troubles, and it is very difficult, looking at the matter from the farmers' standpoint, to understand the reluctance sometimes of the public to pay the slight increase asked by the producers. With all foods reaching an unparalleled level, and in many cases increasing 50 per cent, which the public pays without a great deal of complaint, there is little reason why an increase in the price of milk should not prevail. The consumer does not always seem to realize that the increased cost of producing milk, in higher prices of feed, labor and cows, should in any way be offset to the farmer in an increased price for his product, nor does the consumer always realize that he is getting in milk the cheapest food which his money can buy.

The past year has also seen the abolition by the Interstate Commerce Commission of the so-called leased car system all over New England, and the establishment of equal rates on all lines of railroads, the rates increasing in every 20-mile zone. This question of rates and the leased car system has been agitating this section for many years, and now that it is settled it is hoped that several evils of the milk problem have been averted for the present. At the hearings before the Interstate Commerce Commission, both in Massachusetts and Washington, this Board was represented by the Attorney-General, who also represented the State, and we feel sure that the interests of the State were well looked after. Certain members of the Board and Mr. Harwood of the Dairy Bureau have followed the hearings closely.

With the rate and leased car questions settled there is a strong feeling among many producers that Massachusetts will stand a more equal chance in the competition for the milk market of our State. Certainly no great change can be looked

for immediately, nor is there likely to be any decided change in the near future, unless our producers can raise milk as cheaply as it can be produced and shipped to our markets from other sections. The dealers are going to secure their supply where they can purchase it cheapest, and if rates compel them to come to Massachusetts, this fact will soon become known and stimulate an increase in Massachusetts-produced milk. Time alone will tell in this matter, but if the agitation continues, and the demand is increased for pasteurized milk, Massachusetts will continue to be in as difficult a position as before, because pasteurized milk may be handled from distant parts more easily than fresh.

The Boston Chamber of Commerce and other organizations have this year discussed very seriously the question of the grading and labeling of all milk, and while this seems to offer an inducement to the producer in an increase in price for producing a high grade of milk, the difficulty of establishing and maintaining a standard is apparent.

Some of the larger dealers have already adopted a grading label, but as yet there is no official grade established. Many steps advocated by organizations are important in the solution of the milk problem, and we heartily endorse the establishment wherever practicable of county milk stations by the producers, also better systems of dairy management and better stock. An advertising campaign which will place in every house the leaflet on "Food Value of Milk" is highly recommended, along with a better system of city distribution.

Massachusetts needs the dairy cow to go hand in hand with the development of the idle lands of the State, and while we may look forward in any event to the cultivation of these lands, quicker returns will be received if some form of animal husbandry goes with the work.

INSECTS.

There have been no very serious outbreaks of periodic insects this year, but the usual number of the more common pests has been noted. The gypsy moth has been very abundant in certain sections, and has done considerable damage on cranberry bogs and on farms adjacent to woodlands. There was an abundance

of potato beetles in many sections and some slight showing of cabbage and vegetable pests.

In spite of the wet weather there was an abundance of red spiders on many out-of-door crops. Orchard insects were not as abundant, although aphids caused considerable damage early in the season. Codling moths, too, were bad in most of the apple sections.

One encouraging feature of the insect situation is that some of our imported insects seem to be getting nearer a balance where their own enemies control them in this country; particularly is this true of the brown-tail moth and elm-leaf beetle, both of which have not been as bad the last two or three years as formerly. Many of the parasites and diseases of our imported insects have been brought into the country recently, and the effect of their work is now being noticed materially.

THE WHITE PINE BLISTER RUST.

The appearance of the white pine blister rust in this country in 1908 led in 1910 to a direct quarantine on all five-leaved pines coming from foreign countries. In spite of this fact the disease has secured quite a definite foothold, and its continued discovery has led to joint action by the several States, looking toward steps for control.

A bill was introduced calling for an appropriation of \$10,000 which, through the aid of the Massachusetts Forestry Association and others interested, was enacted, and the work started in the spring of 1916, with Dr. H. T. Fernald in charge and Dr. James F. Martin as his deputy. Dr. Fernald's report will cover the details of the work.

The Nation-wide seriousness of the situation led to the formation of an interstate committee on the white pine blister rust, and the secretary was chosen chairman. It was due to this committee's work that much of the information relative to this disease was spread about. The committee has had several meetings, and at the most recent one in Albany, New York, over 15 States, as well as Canada and the United States Department of Agriculture, were represented. Many problems connected with the question were discussed, and the following recommendations made: —

That a Federal quarantine be established on all trees and shrubs from foreign countries; that Congress be asked for an appropriation of \$240,000 for work in blister rust suppression; that currants and gooseberries be declared a public nuisance and be destroyed in all sections where the disease has been found; that Congress establish a line north and south on the Great Plains, beyond which no currants or pines may be sent from the eastern part of the United States. The interstate committee has been reorganized so as to take in all areas in this country and Canada where five-needle pines grow, and the name has been changed to the "Committee for the Suppression of the Pine Blister Rust in North America."

Clearly we are facing a very serious situation in relation to our white pines, and if we are to save this valuable tree to the State and Nation, drastic action must be taken at once.

THE SEED SITUATION FOR 1917.

From the farmer's viewpoint the seed situation for 1917 is generally disturbing, due to a combination of causes. Weather conditions during the summer of 1916 in many parts of the United States were unsatisfactory for seed development and maturity, while seeds from Holland, France, Germany and Denmark have been cut off by an embargo since the early part of the summer, and there is no assurance of its being lifted in time to affect the 1917 supply.

The seed bean crop is short, due to unfavorable weather and labor conditions. Various estimates place it at from 15 to 40 per cent of normal. Sweet corn is estimated at 50 per cent, and peas at from 30 to 40. Eastern grown carrot seed was almost an entire failure. The principal seeds affected by European conditions include cabbage, cauliflower, spinach, mangels and beets from Denmark, celery, carrots, lettuce, radishes and turnips from France and onions and garlic from Italy. Danish seeds have been out of the market so far on account of the embargo, and it is impossible to say how long this condition will continue. Spinach seed, which last year sold for 12 cents, is now quoted at 60 cents. There are no available statistics as to the Danish supply which would be available to the country should the embargo be lifted, although it is reported that the Russian

government has been a heavy buyer of Danish seed. French seed is very hard to get, only about 10 to 15 per cent of the orders being filled, and this same condition applies also to Italian seed. Sugar beet seed is very short, as there will be no available foreign supply.

The only bright spot in the situation concerns the American grown grass and clover seeds. The supply of timothy, redtop and the clovers is adequate and prices will be normal. Alfalfa seed is reasonable and the demand increasing. Hungarian millet was almost a complete failure and will be scarce, but there seems to be plenty of the Japanese and golden varieties. Foreign grass seeds, on the other hand, are very scarce, and this will greatly affect the lawn mixtures in which such grasses as the fescues and bent are used.

The outlook for seed potatoes is extremely uncertain. At present, prices are very high, although reports seem to indicate that adequate reserves for seed are being held. Red varieties are very short. At present no quotations on seed potatoes have been made. Farmers should give the seed proposition early consideration, especially on all kinds of domestic seeds. Certain varieties of beans are reported to be already exhausted, although there is a possibility of the visible supply of foreign seeds being augmented by a lifting of the present embargo.

We have given far too little thought to the question of seed production. Here and there we find a man engaged slightly in this business, but principally in producing some particular strain for which he has a monopoly of the market. Large quantities of seed of best strains and purity should be grown here, and there can be no doubt that in this country with the varied conditions there must be places where practically all the seed we need may be grown. There is another argument for the production of our own seeds in that there is no doubt that certain very destructive diseases have been imported into this country on seed brought from abroad, and we must look for a continuation of these introduced diseases if we continue to import so much of our seed.

Prices for the next few years certainly should be attractive enough to stimulate the industry which when once established may easily compete with the world. Some phases of the seed

business should be attractive to those in remote sections from a market, or where shipping facilities render it impossible to ship out the fresh product.

THE FERTILIZER SITUATION.

The fertilizer situation, as outlined in my last annual report, has been profoundly affected by the war, and during 1916 has been anything but favorable for the farmer. The outlook for 1917 is not bright; in fact, nothing but the cessation of hostilities and the resumption of imports of potash and basic slag from Germany can materially lower prices. There have been no imports of potash salts from Germany since January, 1915, compared with a normal importation of 800,000 tons.

The price of muriate of potash is now quoted at \$450 to \$460 per ton, and sulphate at \$275 to \$300. These quotations are practically nominal as it is almost impossible to secure the raw material. Chilean nitrate has continued high, and at present it is quoted at \$70 a ton, about the same as last year. The fertilizer companies have been unable to secure basic slag from Germany, and the slag produced in this country is not of the required quality for fertilizing purposes. Acid phosphate is about 80 per cent higher in price than before the war. Mixed fertilizers have been sold, for the most part, on a no potash basis, and in some cases, notably in the Aroostook County potato-growing sections, some remarkable results have been obtained with these no potash fertilizers. Of course, this was on land which had received applications of potash during previous years, so that the crop must have been drawing on the reserve supply in the soil.

The attempts to find profitable sources of potash in this country have continued. One source has been the waters of Jesse Lake in Nebraska, the evaporation of which has yielded some potash; and the same thing has been done with Searles Lake in California, with Great Salt Lake in Utah, and with sea water in California. The kelp of the Pacific coast has yielded some potash, as has the flue dust of cement works in parts of California and Maryland, and an alunite plant in Utah. It has been stated, however, on reliable authority, that if all the potash-producing plants in the United States were operated at

their full capacity every day in the year there would be produced about 6 per cent of the actual potash which was annually imported from Germany before the war. It is recognized also by authorities in the fertilizer business that in none of these methods is the cost of production low enough to enable the domestic potash to compete with the German at the end of the war. Reports of other sources of potash are constantly being circulated, but seem to lack authoritative confirmation.

Large deposits of phosphate have been discovered in the west, but here, too, it is doubtful if the material is available enough to compete in price with the phosphate rock of Florida, South Carolina and Tennessee.

During the year Congress authorized the erection of a government plant for the manufacture of nitrate from the air, but as this is to be used for ammunition, it will hardly benefit the fertilizer situation. It would seem as though there was a field for private capital to go into the business of manufacturing nitrates in this way, as is now being done successfully in Germany.

To sum up, it seems as though our farmers must plan to place increasing reliance on animal fertilizers and soiling crops for the coming year.

POULTRY.

Four things conspired to reduce the production of poultry and eggs in the State this year, — high labor costs, low vitality in eggs and chicks, bad weather, high prices of feed; and possibly a fifth might be mentioned in that high prices paid for poultry tempted many to sell off their stock rather than carry on the business at the increased costs. The long winter and late spring certainly had much to do with the low fertility, while bad weather served to cause much loss in the young chicks. The number of breeders of pure-bred birds seems somewhat on the increase just now, and that many of these breeders are turning their attention from mere feathers to a utility strain in their several breeds is most encouraging. There certainly is room for improvement in poultry breeds, and especially so in strains which have greater vitality and consequently large producing powers of both meat and eggs. Much experimental work is now being done to eliminate disease among poultry.

Many States have funds for testing stock for white diarrhoea, and while the expense of this work should largely be borne by the poultrymen themselves, there should be more experimental work done, with the possible training of more persons to handle such troubles.

It is gratifying to note improvement or achievement in any branch of agriculture, and one matter which has come within the secretary's notice deserves attention. The raising of turkeys has become almost a lost art in our State, and it is only within a few years that there seems to have been a revival of this industry. That there has been a revival in turkey breeding is largely due to Miss Margaret Mahanney of Concord, who for the past few years has been steadily working to overcome those troubles which have caused the destruction of large quantities of turkeys in this country. That Miss Mahanney has succeeded is attested by the fact that she raises turkeys, and raises a very large per cent of those hatched. Her work has attracted attention in many States, and it has now come to the place where much of her time is devoted to assisting others in this work. The secretary would recommend to the Board that a committee visit the farm of Miss Mahanney in Concord and see the progress which has been made in this line of work, and if she is deserving of some recognition by the Board, that some suitable award be made her.

Other lines of poultry work are not receiving the attention that would seem to warrant the high prices on all poultry products, and while ducks, geese and guinea fowl are raised in some quantities, we do not begin to supply the market demand in this State.

THE PRODUCTION OF FOOD ANIMALS.

Very little progress has been made during the past few years in the greater raising of meat-producing animals. There are a few herds of beef cattle in the State, but these are largely used for breeding purposes, and seldom does one see them in the market as beef. It is also discouraging to note that sheep are still continuing to decrease, while hogs seem to remain about the same, although there are some attempts to revive this industry in some sections.

Arguments that there is no money in the business do not seem to be the final answer to this question. Capital, that ever-present factor in all development, has undoubtedly been attracted to those great centers where these animals are now produced on a large scale, and while we may have all the conditions necessary for their rearing, cattle, sheep and swine will not come back without some decided and joint effort on the part of the farmer and capitalist.

WILD GAME.

Last year the secretary made several suggestions relative to the farmer and the game question, particularly in relation to pheasants. A bill introduced in an attempt to change the time of the open season on all game failed of enactment through the opposition of the sportsmen. Farmers have been most patient in regard to this whole question of game and of the sportsman, but judging from the increase in posted land that patience is becoming exhausted. One thing that the sportsmen have got to understand is that if there is going to be a continuation of good feeling between them and the landowners, the sportsmen must respect the landowners' rights, and if these rights are not respected the conflict which is bound to follow is going to drive the sportsmen out of most of the land in the State. The bill asked for was not unreasonable and only shifted the season along so that very little of the open season came while crops were in the fields. It also gave the sportsmen one holiday during the open season, and apparently the only hardship it entailed was that the woodcock flight season did not come within that of the proposed open season.

Pheasants have not been as numerous this season as last. That these birds are destructive more or less to crops is true; that they do a great deal of good is also true; but the damage done to growing crops by sportsmen during the early part of the season is great, and if the sportsmen only realized it, has resulted in much land posting.

Wild deer are not as numerous in the State as they were six years ago, as the following table will show, and damage from them is reported as less: —

Summary of Deer shot during the Open Seasons of 1910 and 1916.

COUNTY.	1910.	1916.
Barnstable,	-	40
Berkshire,	214	181
Bristol,	-	26
Dukes,	-	2
Essex,	-	23
Franklin,	268	167
Hampden,	216	164
Hampshire,	180	139
Middlesex,	-	22
Norfolk,	-	16
Plymouth,	-	60
Worcester,	403	159
Total,	1,281	999

A bill accompanying this report for the removal of protection from the starling should be favored. This bird is increasing very rapidly in the State, and as its food habits are now known it promises to be a most destructive pest. Flocks of these birds, ranging from 500 to 2,000, are not infrequent, and when they get to the point where their common food is scarce they will attack all kinds of fruits.

ALFALFA AND COVER CROPS.

We are glad to report continued interest in the growing of alfalfa. Indeed, the increased acreage of the crop is very marked throughout the State. Very much good work has been done along this line by the county agents. Very large yields have been common throughout the State this year, and while our climate often makes it difficult to dry the crop, in most cases it may be fed green.

The Alfalfa Growers' Association has had much to do in keeping up the interest in the crop through meetings and demonstrations.

The exhibit at Springfield by this association, in connection with the Massachusetts exhibit, was most interesting, and

showed many features necessary in growing the crop. A part of this exhibit was made by the experiment station to show, first, effect of lime in various quantities; second, the effect of varying proportions of organic matter; third, the effect of inoculation; fourth, effect of potash; and fifth, varieties. The result of these experiments showed, first, that lime is useful up to three-quarters of the amount required to make soil neutral; second, that moderate amounts of organic matter are necessary; third, that inoculation with lime added did not show any particular results; fourth, that potash did not seem to be necessary; and fifth, that Spanish, Dakota, Common, Canadian, 24452 Yellow Flowered, Grimm and Baltic varieties were best in order named.

As these results were from pot experiments their results might not apply to field culture, and in variety test none of these were wintered over.

Several beautiful fields of alfalfa have been visited by the secretary this season, and in particular those of the Massachusetts Agricultural College and Medfield State Hospital are worthy of special notice. The Worcester County Agricultural Society had a splendid exhibit in the competition and there were over ten entries.

Cover and soiling crops, such as crimson clover, soy beans, rye, vetch, winter wheat, oats and peas are being grown more and more in the State. Many farmers are turning to these crops for their supply of nitrogen and for use in protecting land from washing in winter. More experimental work on these crops should be made, as it is undoubtedly true that more of these crops will have to be used as fertilizers grow scarce.

One variety, lupine, does not seem to have been used a great deal as a nitrogen gathering plant, and yet its possibilities are great.

LEGISLATION NECESSARY FOR 1917.

The secretary has this past year spoken at several meetings in this and other States on a subject which he considers of vital importance in the future of agriculture, and especially that of Massachusetts. This subject is organization in agriculture. With an agricultural population of less than 8 per cent in our State, with large tracts of land lying idle, with capital more abundant

than anywhere in the country, and markets at our doors, the condition in which we find ourselves is certainly not healthy, agriculturally speaking.

The point in this question to which your attention is most directed is of the necessity to organize for production as well as for sale; organizing for marketing has been advocated and carried out with some small results, but it is only beginning to dawn upon us that in order to have something to sell we must first grow something. True, we do have goods to sell, but only in a very few centers can you find large quantities of well-grown products of a given variety and grade. The necessity of really beginning all over again in the production of crops seems not to have occurred to us. We have thought that we could sell whatever we have grown; instead, we find that we are face to face with agricultural products grown in other States by organizations which have all the machinery for handling the crop from the seed to the market. We have many splendid centers as yet untouched which, when organized to grow one particular crop or a succession of crops for the season, could easily, under good management, become prosperous, self-sustaining communities.

Last year we presented to the Legislature a bill for a chief of markets, as an attempted first step in the general question of improving the sale of our crops. This bill failed to become a law, and it seems to the secretary that the time has now come to present the whole matter of organization and markets to the Legislature in order that the question may be more thoroughly understood. That this matter is not alone for the farmer's benefit ought to be apparent from the fact that increased production and better distribution should work for the benefit of the consumer as well as the producer, and that all interested in the upbuilding of the State should see in a better agriculture improved conditions in all walks of life. The productive use of the now idle land will certainly bring to the towns a larger population, increasing income from taxes, with a consequent bettering of school, civic and health conditions. Land values will certainly increase, and the effect from the success of one center is bound to be transmitted to those near by and from them to the cities.

As a first step in this program there should be organized

under this Board a bureau of organization and marketing, the work of which shall be along these general lines.

1. To ascertain as far as possible the sections of the State adapted to the production of certain crops, and to organize these sections to produce such crops.

2. To connect these separate small units with a greater State-wide organization for the distribution of this crop.

3. Through the marketing department of this bureau to assist in placing these products on the markets to the best advantage of all concerned.

4. To assist cities and towns in establishing markets and improving market facilities.

Along with this general program should also go the movement to develop our now unproductive land areas both wet and dry. There are thousands of acres of wet land, much of it far more fertile and more easily workable than a great deal of the land now under cultivation, and where small areas of this land have been used very surprising results have been obtained. One section reports producing 6 tons of hay per acre; another better than \$500 worth of market-garden crops. What is needed for this land is a comprehensive scheme for under-drainage in fairly large tracts. As these tracts are usually in the hands of several proprietors, in this work they simply must co-operate, and there must be some way of preventing one obstinate landholder from blocking the scheme for all. It was for this purpose that the statute which is now known as chapter 195 of the Revised Laws was passed in colonial days. This law is practically an enabling act which authorizes a majority of the proprietors of a tract of wet land to have commissioners appointed by the Superior Court to do the work, and then the cost is levied and collected as taxes on the lands of the owners benefited. The great trouble with this law is that it does not provide for the payments to be made in installments. An amended act with this installment provision in it, and also a provision for the issue of bonds to defray the cost of the work until the installments are collected, was introduced by the Board last year, but was referred to the next General Court by the committee on joint judiciary.

The secretary recommends that a similar bill be introduced

this year with the further amendment, that the petition be filed with the county commissioners instead of with the Superior Court, as our courts are already overburdened with work.

But this is not all our drainage program. In 1913 an act was passed empowering the State Department of Health and the State Board of Agriculture, acting jointly, actually to take some land by purchase, gift or eminent domain, drain it, and then sell it at cost; and \$25,000 was given this Joint Board for use in this work. No land was ever actually drained under this act, however, as while preliminary surveys were still being made the Legislature of the following year gave this appropriation to the State Forester for use with the unemployed. After giving much thought to this question, it seems to the secretary that the function of the State should be to find out the facts about the wet land in the State, make preliminary surveys and maps, and have this information available for all, leaving the actual work of drainage to private capital, as has been outlined before.

The secretary has, in company with a representative of the United States Department of Agriculture and the engineer of the Department of Health, made quite a study of the areas of wet land in the eastern part of the State, and has taken soundings in many of these places. These rather rough surveys show in most cases that the lands are very valuable, but the most important results that these studies show is that in order to be successful in agricultural development certain areas must be more carefully examined; also that certain areas would undoubtedly be absolute failures unless handled in a very careful way. The net results of our work show that we need some trained person to go over the whole situation in the State thoroughly, and make a report on what should be done. To this end, besides passing the amended drainage bill, we should have an appropriation to carry on this work. There is every assurance at this time that if the State will show an interest in this matter, the United States Department of Agriculture will co-operate with us to the extent of furnishing an expert to do the preliminary work. The work of determining and mapping the forest lands of the State is now being done by the Forester's Department, and there certainly is no good reason why the

other lands should not be so determined. Together with this work should go a general soil survey of the State, for at the present time only three counties of the State have been surveyed and only one of these results published.

In order to get the government to assist in this work the State must co-operate to the extent of furnishing some money. The secretary therefore recommends the introduction of a bill repealing the act of 1913 and amendments thereto, but giving the Board of Agriculture and Department of Health power, acting as a sort of joint drainage board, to do this preliminary work, and making the issue of county drainage bonds, under the other drainage bill, which has been outlined, dependent on the approval of this Joint Board. This will mean that the soundness of each drainage project must meet the approval of a body of impartial experts, the engineering department of the Department of Health looking after the engineering features, and the drainage committee of the Board passing on the agricultural value of each proposition. The secretary recommends that the Board be allowed an annual appropriation of \$5,000 for this work.

Other desirable legislation looking toward some of the matters we have presented or supported in the past should at this time be set aside to obtain those things which seem to be more important in the immediate agricultural problem.

The Board is rapidly nearing the place where we must increase our regular force if we are to take up new work. With our present office force and equipment we are handling about all the work that we can do effectively.

Much new work has been added in the last few years without changing materially our office force or equipment. Since the year 1900 the work of the nursery inspection, apiary inspection, apple-grading inspection, distribution of bounty to poultry societies, encouragement of dairying and encouragement of orcharding have been added to the Board's work, and in addition many more calls are made on the office force, due to greater interest in agriculture.

It should be borne in mind that in all of this work and during this time practically no increases of salaries have been made to those who have had to bear the burden of work, while

in other State departments and institutions salaries have been largely increased.

That new laws or rather new work by this Department should be undertaken is very apparent, but that the present system of adding new work without extra compensation will prohibit securing a high-grade staff is also apparent. For this reason the secretary recommends that he be empowered to employ assistants and that to cover the cost of this and of a new stenographer who is imperatively needed the appropriation for clerks be increased to \$9,000, and be known as the appropriation for office assistance.

MARKET LAW.

The Legislature of 1915 passed a law in relation to cities and towns of over 10,000 inhabitants establishing public market places before March, 1916. The approval of such sites was left to the Board. In connection with this law the Board, as soon as possible after its passage, sent out notices to all towns and cities coming within the scope of the law, quoting the law and requesting that sites be named as soon as possible. Twenty cities responded, but owing to the slow process usually taken by correspondence, it was decided, in order to get a report before the time limit expired, namely, May 1, 1916, to visit all cities and towns not already complying with the law. The marketing committee undertook this work and employed Mr. John B. Moore of Concord and David T. Barnard and N. B. Flood of the committee to do this work. Fifty-three cities and towns were visited, and now practically all of the cities and towns of the State which come under this law have market places set aside. Comparatively few of these places are used, however, and no doubt in many cities and towns they will not be used for years. However, their establishment gives the first step in a program for bettering the market conditions of the State.

In connection with the work of these agents, many interesting points were brought out, generally showing that while many places would like to do something in relation to markets, there is so little known about the whole question that it is impossible to get started right. All of this proves more and more con-

clusively that the establishment of a market bureau by the State could materially assist in solving many of the problems with which cities are confronted.

SECRETARY'S TRAVEL.

The secretary has not traveled very much outside the State this year, but has largely confined his efforts to getting better acquainted with certain problems within the State, such as drainage, markets, fruit growing and organization. An extensive study of the Cape country has been made with the idea of recommending some action looking toward a greater development of that section. Some interesting facts stand out prominently in relation to that part of the State.

The fisheries along the coast and the harbors where fishing vessels bring their catch are abundant. In the process of dressing fish for coolers and market much fish scrap is made. There are also quantities of fish below market grade which are not utilized. In this same section large quantities of seaweed may be found. Taken together these materials would seem to form the basis of a very cheap and high-grade fertilizer, the processing of which ought not to be very expensive. Added to this store of plant food there is in this section large quantities of land which only needs the elements contained in such fertilizer to make it produce abundantly. Much of this land lying between the hills of this region is amply protected from sweeping winds, — generally the drawback to successful farming in this section. Markets are abundant, and an ever-increasing summer population promises much to the person who will venture in Cape Cod farming.

Travel in the State has been about 8,000 to 10,000 miles; outside State visits have been made to New York on apple-grading law and white pine blister rust; to Vermont on the New England Fruit Show; to the New Hampshire State College; and to Connecticut.

Mr. P. M. Harwood represented the secretary at a meeting of the secretaries and commissioners of agriculture in Washington, in May, when a National Association of Secretaries and Commissioners of Agriculture was formed. This association hopes to bring the problems of the various State departments in closer

touch with the work of the United States Department of Agriculture, where it touches more closely on control or administrative functions. While the secretary is not very strong for increasing the number of organizations, it would seem, however, that the time has come for a closer relationship between the State departments of agriculture, in order that their work may be harmonized and made more effective.

THE MASSACHUSETTS AGRICULTURAL DEVELOPMENT COMMITTEE.

This committee, which was organized in March, 1915, has held monthly meetings during the past year. Questions of relationships between organizations, the rural problem and a general plan for the gathering of statistics and facts relative to the agriculture of the State have been adopted by this committee.

The make-up of the committee has remained the same, although Mr. H. A. Moses, representing the League of Farm Bureaus, has not been able to attend, being actively engaged in the work of the Eastern States Agricultural and Industrial Exposition and the National Dairy Show. Mr. Moses' services have been greatly missed.

While the work of this committee must of necessity be slow, it is nevertheless important, and although it lacks official State confirmation its findings should have weight in that its personnel represents largely the official organizations in agriculture.

The committee has been asked to come before the Commission on the Investigation of Agricultural Education and state its views as to the agricultural development question.

THE AGRICULTURAL COLLEGE AND THE COMMISSION ON INVESTIGATION OF AGRICULTURAL EDUCATION.

One prominent factor in relation to the Agricultural College this year is the investigation undertaken by a commission appointed by the Governor, under a law enacted for the purpose. The wording of this law places a greater work upon the commission than the college investigation alone, in that it seeks to go over the whole agricultural situation and recommend some

solution to many vexed points, such as duplication of work, types of education, consolidation or co-ordination.

This commission's investigation touches closely upon many points of the Board's work, especially where the lines cross those of the agricultural college.

The Board and the college have for some time past considered various phases of their work more or less unofficially, but during the past year one meeting of the trustees of the college and the members of the executive committee of the Board has been held, and the question of relationships was left, by vote of this meeting, to a committee of the trustees and the Board, two members of each body, with the president of the college and the secretary of the Board.

This committee met and after going carefully over the matters under discussion voted to accept the following report as of the joint committee to both Boards: —

I. The State Board of Agriculture and the Massachusetts Agricultural College are, or should be, regarded as public agencies, to be supported by public funds and to be subject to appropriate State control.

II. The chief function of the State Board of Agriculture is administrative.

III. The chief function of the State Agricultural College is educational.

IV. There should be a standing joint committee on co-operation and adjustment, comprised of two or more members of the Board of Agriculture and a similar number from the Board of Trustees of the college, in addition to the secretary of the Board and the president of the college.

V. *Memoranda of Agreement.* — There should be a distinct written agreement on the form and method of division of labor in all cases where there is, in the opinion of either institution, any overlapping or duplication of work.

VI. It is understood that in the matter of employment of members of the college staff as executive officers in the control or other work of the Board, there will be definite agreements between the Board and the college.

Disposition of Certain Existing Pieces of Work.

I. The college to take over the Farmers' Institutes.

II. The Board of Agriculture to take over all control work now carried on by the college.

III. All shows and exhibits at which prizes are offered to be under the auspices of the Board of Agriculture.

IV. The advertising of Massachusetts agriculture to be under the Board of Agriculture.

V. The question of publications to be subject to agreement.

VI. The question of the educational administrative work of the Board of Agriculture was left to Secretary Wheeler and President Butterfield for further consideration and report.

At a recent meeting of the trustees of the college, after the committee of the trustees had reported to that body, the whole matter was referred back to the joint committee, and also a meeting of the trustees and Board was requested to go over this whole matter again.

The work at the Agricultural College has been along the usual lines, although some new work has been taken up and some additions to the Extension Department have been made.

The establishment of the market-garden experiment station, authorized by the last Legislature, at North Lexington seems to fill a demand created by the market gardeners for a place where experiments in their line of work could be carried on directly within the area where the greatest amount of work is done. This station is to be under the immediate charge of the Agricultural College, with Professor Harold F. Tompson in charge.

The secretary has enjoyed very cordial relations with the college through many departments, visiting there over a dozen times and addressing some of the meetings during farmers' week.

The college staff has continued to give us splendid service in the Farmers' Institute work and along other lines. One phase in the relationship of the college and Board should, as soon as possible, be placed on a more definite basis. We refer to college officials acting in the capacity of administrative agents in the control work of the Board. There are two such men now acting for us in the nursery and apiary inspection service, respectively. For fifteen years we have had the splendid services of Dr. H. T. Fernald in the nursery inspection work. He has given us unstintingly of his best thought and experience, and has placed the nursery inspection work of this State above reproach. Not alone for the actual control of diseases and insects has he worked, but for the general upbuilding of the business. He has represented us many times in Washington,

delaying or averting adverse action against Massachusetts when such action threatened. With the advent of the white pine blister rust the work of its control has been placed upon Dr. Fernald, and here again has he displayed the same ability to meet a difficult situation.

Dr. Burton N. Gates, as Apiary Inspector, has also given to the Board valuable service, not alone in the suppression of bee diseases, but in hard work to build up the apiary industry.

There is no doubt of the value to college workers in being connected with such work, as the experience gained is most valuable to them and the institution, too, for research and teaching, but the duties imposed by these laws should not be administered by members of the college staff, for in so doing they are likely to be involved in lawsuits and cases in court. The question of compensation is also difficult to adjust, and makes it seem as if the college man is receiving an extra salary, when in fact he is more likely to be underpaid by one department or another. The secretary would recommend, therefore, the adoption of recommendation VI. in the agreement between the two Boards.

In other respects the lines of work between the two organizations should be clearly drawn, so that there may be co-operation and definite understandings upon all questions.

There has been some falling off in attendance at the Agricultural College this year. Some are inclined to lay the blame for this to the investigation now going on in reference to the college, while others explain it as due to good industrial conditions, where many young men are finding profitable employment. Whatever the cause, it is to be regretted that there is a falling off in attendance, and it is hoped that it is only temporary.

The Commission for Investigating Agricultural Education has had several public meetings at which questions relating to the college were discussed. This commission is composed of L. Clark Seelye, chairman, Payson Smith, secretary, Charles E. Burbank, Warren C. Jewett and William F. Whiting, and it is understood that they are to investigate thoroughly all questions relating to agricultural education.

FEDERATION OF FARM BUREAUS.

The very active organization known as the Federation of Farm Bureaus, and composed of delegates from the various bureaus, has the past year held its usual meetings and discussed topics along lines of its work. Particular emphasis was laid on marketing in the June meeting, and on organization for milk producers in November.

The Board has enjoyed very cordial relations with the Bureaus, and has co-operated with them in many ways. Much help and interest has been manifested in the work of enforcing the apple-grading law, and the Board at this time wishes to thank the Bureaus for their co-operation in this work. Institute and demonstration work has been greatly assisted by the Bureaus.

One new county, Essex, has added a county agent, who is to be under control of the county school at Hathorne. Mr. F. Howard Brown has been appointed county agent, and is to devote his entire time to the work.

Middlesex, while not organized with a regular bureau, has at present a worker among the market gardeners, and is further discussing the question of a bureau. On the whole, this work in most sections of the State seems to be going ahead rapidly, and where it is sticking strictly to agricultural work much good is being accomplished.

On invitation of the Federation the secretary was appointed a delegate from this Board to the Federation of Farm Bureaus, and in the change of law regulating the make-up of the Board, which allowed a delegate from the Federation to the Board, Mr. L. L. Richardson of Leominster has been elected.

NURSERY INSPECTION.

This work has gone this year much along the same lines as formerly, although the work has been increased to cover the gypsy and brown-tail moth inspection in smaller nurseries which were not covered by the government inspectors, whose work only covered stock going outside the infested zone. It has been more difficult than usual to obtain men for this work, and in spite of an examination held by the Civil Service Commission

very few good men were obtainable. The white pine blister rust work also drew heavily on our supply of trained men. Stock from abroad came over in about the usual amount, although a great reduction was looked for.

The work has progressed satisfactorily, and has the support of our nurserymen.

The increase in the number of nurseries and a larger planting has made more demands upon our force.

APIARY INSPECTION.

The very small amount allowed by the Legislature for carrying on this work makes it exceedingly difficult to cover the State properly for the suppression of bee diseases. Our inspectors are, however, giving much thought to the work, and are covering a great deal of territory for the amount of money available. Every once in a while the cry is taken up by certain persons against continuing the disease control work among bees. Little do these persons appreciate the value of bees to this State. We are developing large fruit orchards as well as fruits of other kinds for which the bee is very necessary in fertilizing the blooms; also, the greenhouse cucumber industry is demanding each year more and more bees.

All of these demands for bees cannot be met at the present time from this State, and every time we bring new bees here we increase the danger from diseases. The honey output could undoubtedly be largely increased by the control of bee diseases, and in some sections of the State where there is an abundance of honey-producing plants bees kept for honey would undoubtedly be most profitable. Along with this apiary work it would be advisable at this time for the State to take up the rearing of queen bees in large enough quantities to supply the demand within the State, as no doubt in some cases foul brood and other diseases have been brought into the State with queens, practically all of which are produced in other States.

A disease known as bee paralysis has apparently made its appearance in some sections of the State this year, and while very little is known about its origin and control, we do know that this disease killed over 80 per cent of the bees in England.

An English expert on bee diseases has been in the State a

good deal this season, and in company with Dr. Gates visited many yards and examined bees suffering from this disease. So far as we know, the disease has caused but little damage, but it must be carefully watched.

In order to cover the State to better advantage this year there should be an increase of \$1,000 in the appropriation for apiary inspection work.

THE DAIRY BUREAU.

Generally in the year of high prices of all foods greater activity on the part of persons inclined to disobey the dairy laws is looked for, but this year fewer prosecutions have been made than usual, although a strict watch has been kept for offenders. The Bureau, however, has had its hands full in the clean milk work, dairy inspection, milk exhibits, the preparation of various pamphlets, etc.

The amendment to the dairy law, enacted at the last session of the Legislature, has broadened the work of the Bureau in many lines, and work along several new lines has been planned, principally looking toward a better dairying situation in the State.

The general agent has kept in touch with work along dairy lines in various parts of the country, visiting Washington, New York and Rhode Island. He has kept in close touch with the various hearings before the Interstate Commerce Commission and our own Public Service Commission.

Mr. Charles M. Gardner, who for six years was chairman of the Dairy Bureau, retired this year, and Mr. G. E. Taylor, Jr., was appointed on the Bureau. Mr. Gardner was an earnest, faithful worker for the Bureau, and an efficient chairman, always looking to improve the standard of the Dairy Bureau's work. Those who have worked with him appreciated his talents and miss his energy. Mr. D. E. Bradway of Monson was elected chairman of the Bureau in place of Mr. Gardner.

STATE ORNITHOLOGIST.

Interest in bird life is increasing in Massachusetts year by year, and the character of the work being done by our own State Ornithologist is being more and more appreciated, and is

enhancing the reputation both of Mr. Forbush and indirectly of the Board as a sponsor for this work. The year just closed has been an especially active one. In Massachusetts the ornithologist has continued his experiments with birds as protectors of crops, and his investigations of the distribution of birds in the State and of the foods of birds. He has written during the year bulletins on "The Domestic Cat" and "Natural Enemies of Birds," and a circular on "Food Plants to attract Birds," and has revised and enlarged the "History of the Game Birds," which has now been published in a second edition.

In the national field Mr. Forbush was appointed by the Federal Secretary of Agriculture as a member of a committee to pass on the proposed regulations for enforcing the migratory bird law. The National Conservation Commission also appointed him on a committee to consider the conservation of wild birds and animals, and the question of reservations for their protection; and he represented the Board in Washington in support of an appropriation for the migratory bird law, and in support of the treaty with Great Britain for the protection of birds in the United States and Canada.

An appreciation of Mr. Forbush's work, by Dr. W. T. Hornaday, one of the greatest conservators of wild life in this country, would not be amiss in this report. Dr. Hornaday says:—

The Forbush literature that I already have acquired is immovably fixed in my own working library, from which nobody ever will be able to pry anything loose while I live. Everything of yours that can be bought, we will buy for cash. Everything that is to be procured by favor, we will pray for.

STATE FORESTER.

It has been the custom during the past few years for the secretary of the Board of Agriculture in presenting his annual report to make some reference to the work being accomplished by the State Forester in the development of a definite forest policy. The secretary believes that Massachusetts may justly claim to stand in the front rank of the States pursuing an advanced and intelligent system of encouragement of forestry. The stability of forestry as an economic proposition depends in

large measure upon the proper protection given against all those agencies which threaten it, such as forest fires, insect depredations and other dangers.

It is gratifying to know that to meet the fire danger there has been created a splendid fire-prevention system. Under the operation of this system few fires burn for any considerable time without being discovered and reported from some lookout station, thirty of which are now located at suitable points in the State. This has resulted in reducing the annual losses caused by forest fires from a sum well up in the hundreds of thousands of dollars a few years ago down to less than \$50,000 the past year.

The application of modern forestry principles to the work of suppressing the gypsy and brown-tail moths has been quite extensive during the past year, and the result has been extremely satisfactory.

Last year the secretary reported the purchase by the State Forest Commission of a tract of land comprising about 1,700 acres in the towns of Winchendon, Royalston and Templeton, and named the Otter River State Forest. During the twelve months just past the same commission has acquired two more tracts, one of 6,000 acres in the towns of Plymouth and Carver and named the Myles Standish State Forest. The second tract of approximately 1,000 acres in Middlesex County, in the towns of North Reading and Andover, has not yet been given a name. The awakened interest on the part of our citizens generally in all that pertains to forestry seems to assure a bright future for this important undertaking.

APPLE GRADING.

The apple-grading law as a compulsory measure went into effect on July 1, 1916. Six field inspectors were appointed, namely, Mr. Alden C. Brett of North Abington, Mr. F. H. Greeley of Salisbury, Mr. W. F. Plummer of Newbury, Mr. Karl M. Perham of Chelmsford, and Mr. John H. Hardy, Jr., of Littleton. Mr. R. Edwards Annin, Jr., was appointed chief deputy inspector to have general charge of the work. The secretary and Mr. H. L. White also acted as inspectors in emergency instances. The county agents were also asked to co-operate in the work of advertising the law, and did so with

good results. While the circuit of apple-grading demonstrations conducted by the Board in 1915 had brought this law to the attention of probably a majority of our farmers, still a number had not even heard of the existence of the statute, and so a large amount of educational work was carried on again this year. Demonstrations of the law were given by the Board's inspectors in the following towns:—

Amesbury.	Hathorne.
Amherst.	Haverhill.
Ashfield.	Hopkinton.
Blandford.	Leominster.
Brimfield.	Marlborough.
Bolton.	Marshfield.
Boxborough.	North Brookfield.
Colrain.	Northampton.
Dalton.	Pepperell.
Fitchburg.	Petersham.
Franklin.	Segreganset.
Freetown.	Springfield.
Granville.	Topsfield.
Greenfield.	Worcester.
Groveland.	

In addition, a number of demonstrations were held by the Farm Bureaus and at the Agricultural College in connection with the annual apple-packing school.

In September regular inspection work was begun. The method pursued was as follows: inspectors are furnished with blanks on which to report lots of apples inspected. These are returned to the office, and in cases where the apples are found to be incorrectly graded or branded a letter is sent the offender, pointing out where the mistake was made and warning that packages must be properly marked in the future. Fourteen hundred and fifteen inspections of this sort were made from a total of 396 growers and packers. Of the violations discovered, practically all were cases of incorrect marking, *i.e.*, some of the required marks on the barrels had been omitted, evidently through ignorance of the law and its regulations. In some cases, instead of a letter being sent to a grower, an inspector would make a personal visit and straighten the matter out in that way. A large amount of this personal work was done,

and an effort has been made to convince fruit growers that our inspectors' principal business this year was to help them understand the law. Most growers have taken the law in a good spirit, and it has not been found necessary up to the present time to conduct any prosecutions under it. Some trouble was experienced early in the season with out-of-State buyers, but in every case the offending party, when shown that he was liable to prosecution, has come around and promised to comply with the law. The fact that the apple crop was of such poor quality in some sections, of course, added to the difficulty of enforcing the law in its first year, and it is believed that with a crop of normal quality, such as we may hope for next year, a great improvement will be shown. After two years of educational work it may now be presumed that both growers and buyers are well acquainted with the provisions of the law, and in future its enforcement should be more strict. The secretary believes, however, that this year a lenient enforcement of the law was wisest, as we must have the enthusiastic support of our fruit growers in order to make it a success.

Some of our fruit growers seemed at first afraid to pack under the law, and seemed to have the impression that its provisions were impossibly strict. For this reason more apples were shipped to the Boston market in bushel boxes than ever before, and many growers marked their entire crop ungraded when much of it would have conformed to a higher mark. Closer study will show that this law is in its essentials a simple one, and the secretary believes that another year will find a much larger proportion of the fruit packed under the Massachusetts standard A grade. The law should remain substantially the same as at present for another year at least. One minor change that should be made, however, is the elimination of the words "of the packer or" in section 5, so as to make every barrel bear the name of the person responsible for the packing. The cost of enforcing the law for the six months it was in effect in 1916 was about \$2,000. There will be considerable enforcement work during the months of December, January, February and March, which was not the case last year.

I recommend that in addition to the above amendment an appropriation of \$2,500 be allowed for the enforcement of the law during 1917.

THE FAIRS.

At no time during recent years have the agricultural fairs of the State enjoyed such a run of good weather, for scarcely a fair this year had bad weather. Attendance in most cases was good, but often considerably reduced by the presence of infantile paralysis, which prevailed during the late summer and early fall. The general average of exhibits was high, although the hall exhibits in most cases were smaller and not quite as good as usual. Cattle were reported in abundance and of high grade. Certainly after the no-cattle fairs of 1915 it was pleasing to see the good showing made this year. Sheep, swine and poultry were made of special interest in many places, while in others the children's work formed an important part of the fair, although the infantile paralysis referred to did a great deal toward reducing the children's exhibits.

There still seems to be a tendency among certain fairs to give a great deal more prominence to amusements and fakirs than is warranted in an agricultural fair. Those who contend that these things are necessary should take a lesson from the experience of the exposition at Springfield, when, during the entire ten days of the National Dairy Show, not a fakir or other form of amusement was allowed on the grounds, and yet no one could complain of the attendance.

The rise of the small town fair during the past few years is undoubtedly going to make serious inroads upon the attendance at many of the regular fairs, and unless the fair management is willing to meet this situation there is no doubt that quite a number of our older societies will have to discontinue their exhibitions. One possible solution of this is for a more frequent change in officers. New blood is often needed to get things started in this way, as the community may have changed. Now that access to fairs is made easier and distances are not so important, larger membership could easily be obtained by reaching out into the towns surrounding the fair association. There should be less dependence placed upon the wealthy man in the association who is willing to make up the deficit, and an increased interest obtained by increasing membership. Some of these one-town fairs with their meager equipment are equaling the exhibits

of our old-time societies, and unless there is a speedy reawakening definite changes are bound to come about.

The great variation in the quality and standard of exhibits has called for some definite standard of perfection, and we now have in process of preparation a model premium list for all fairs and in all classes of exhibits. It is hoped that this will be out before another season.

POULTRY PREMIUM BOUNTY.

The seventeen incorporated poultry associations holding shows in the year ending June 30, 1916, and applying for bounty, complied with the law and regulations of the Board in all but three instances. The delinquent associations were notified that they were not eligible, and the remaining associations awarded bounty, as follows:—

	First Premiums paid.	Bounty.
Amherst Poultry Association,	\$133 50	\$89 93
Attleboro Poultry Association,	204 50	198 38
Eastern Massachusetts Poultry and Pigeon Association,	98 00	66 01
Gloucester Poultry Association,	62 00	41 76
Holyoke Poultry, Pigeon and Pet Stock Association,	330 00	222 30
Lawrence Poultry, Pigeon and Pet Stock Association,	152 00	102 39
Lenox Poultry Association,	181 00	121 93
Milford Poultry Association,	240 00	161 87
New England Poultry Association,	262 00	176 49
Northampton Poultry Association,	336 00	226 34
Norwood Poultry Association,	60 00	40 42
Quannapowitt Poultry Association,	82 00	55 24
Springfield Poultry Club,	383 00	258 00
Worcester Poultry Association,	355 00	239 14
Total,	\$2,969 00	\$2,000 00

It will be noted that each association received about two-thirds of what it expended in "State first premiums." Yet, according to law, these premiums were advertised in its premium list as offered by the Massachusetts State Board of Agriculture

through the association. Since the amendment of the law in 1914, and the adoption of new regulations thereunder, there has been repeatedly brought to the attention of the secretary by poultry show officers the inconsistency and even absurdity of requiring associations thus to advertise premiums, reimbursement for the payment of which the Board could not guarantee owing to the limit of the appropriation. No such difficulty is experienced in the case of the payment of bounty to the agricultural societies, for each society knows in advance that compliance with certain requirements will enable it to receive from the Commonwealth an amount equal to the amount expended in premiums up to the maximum fixed by statute. The aggregate sum needed for bounty to these societies is estimated in November each year on the basis of experience. The poultry associations are not so well established as to admit of such procedure, but it is recommended that the following plan be embodied in a bill to supersede existing legislation regarding the payment of bounty to poultry associations.

"State first premiums," as now defined by law and regulation, should remain the basis of payment. Each association incorporated primarily for the holding of exhibitions of poultry, and intending to apply for bounty on account of show to be held, should be required to file such intentions with the secretary of the Board of Agriculture on or before the first day of November in each year, stating the amount which such association proposes to offer in "State first premiums," and, as now, in advance of its show, filing its premium lists and other printed circulars. From these certificates it would be a simple matter to prepare an estimate for submission to the State Auditor, by November 15, of the aggregate required to reimburse in full up to a maximum, say, of \$200 each, the amount to be fixed by law, all associations in need of assistance from the State. A principle on which, for ninety-eight years, bounty to agricultural societies has been granted ought to apply to the payment of bounty to the poultry associations.

At least one association has established a juvenile department, and is offering "State first premiums" to boys and girls. This, together with a tendency toward the adoption of utility standards of judging and the holding of poultry institutes, is

worthy of commendation. The Board can well encourage such tendencies, and continue to emphasize the desirability of placing State money on best birds only of utility breeds.

BOYS' AND GIRLS' AGRICULTURAL CLUB WORK.

The agricultural clubs were conducted along established lines with success in spite of the handicap of a slender appropriation. The "Home and School Garden Club," "Market-garden Club," "Corn Club," "Potato Club," "Pig Club," "Home Economics Club," "Canning and Marketing Club," "Poultry Club" and "Calf Club" comprise the activities of the year. The total membership of these clubs reached 90,000, with workers in nearly every town and city.

The greater interest in the work is manifest in the more effective organization of local units, the zeal of the contestants, and the high standard and quantity of products shown at agricultural fairs and local exhibitions, the whole crystallized and reflected in the unparalleled exposition of garden products, live stock, canned goods, clothing and skill in judging, staged at the National Dairy Show in Springfield in October. The originators and promoters of this vast assemblage of products of the club boys and girls of all the eastern States deserve unbounded credit. It goes without saying that the impetus there given many a young pig raiser, gardener or canner will show in the results attained by the next generation of farmers. No more fundamentally sound movement in support of agriculture has ever been launched than that having for its object the education of our youths in agriculture and the domestic arts for life on the farm, as producers of real wealth to the Nation.

The agricultural societies with a yearly grant of \$200 each from the State, as reimbursement for premiums paid to children and youths, should take the leadership themselves and co-operate with local workers for the purpose of improving the quality and quantity of products exhibited. Judging contests at our fairs, under competent supervisors, will accomplish more in this direction in one year than will result in ten years of mere exhibiting. The losers wonder why they did not win, and they ought to be shown; and the winners should be impressed with the points of excellence or near excellence of their

respective exhibits. Whereas 21 of the 33 societies applying for bounty expended in 1915 in excess of \$800, the bounty available for general premiums and gratuities, only 13 societies paid out more than the \$200 bounty in premiums to children. Is it not evident that the agricultural societies are not doing as much for children as the Commonwealth is ready to pay them for doing?

INSTITUTE WORK.

The thirty-eighth consecutive year of institute work has been completed with the usual satisfactory results.

The revised list of lecturers with subject index, as approved by the committee on institutes and public meetings, contains the names of five new speakers. Six lecturers were dropped. The call for practical speakers increases, and the institute staff is strengthened at every opportunity by the addition of dairy-men, poultrymen, fruit growers, market gardeners, and the like, who are doing something, have a story to tell and are capable of telling it. With few exceptions speakers are given a year's tryout before election to the staff.

Poultry raising continues to be the most popular subject, as it is the most widely practiced agricultural industry; fruit topics stand second, while calls for lectures on vegetable growing, dairying, farm management, marketing and forage crops, and on economic subjects, are frequent.

Organizations to which the Board furnishes speakers are required to print and display the official colored posters adopted in 1914, of which 8,025 were printed the past year. These posters are also used in advertising meetings, exhibitions and demonstrations of the Board, and in calling attention to menaces to and legislation affecting agriculture. From 30 to 100 *questionnaires* on the topic under consideration were distributed at each institute session. These have an inestimable influence on the discussion following the lecture. To these may be attributed in no small degree the cause for the frequent reports that unusual interest was exhibited in this or that institute.

The following table shows the status of institute work for the last five years: —

YEAR.	1912.	1913.	1914.	1915.	1916.
Number of institutes,	138	144	161	153	161
Number of sessions,	154	174	188	189	185
Number of institutes held by societies, .	111	106	86	78	71
Number of institutes held by other organizations.	27	38	75	75	54
Total attendance,	18,172	20,017	22,649	20,609	-
Attendance per session,	118	115	120	107	-

One of the societies held 11 institutes; 3 held 4; 8 held 3; 6 held 2; 12 held 1; and 3 held none; 54 institutes were held by other organizations.

To take care of the increased demand for institutes and publications, to provide for the administration of the apple-grading law, and the operation of a bureau of organization and markets, an increase of \$6,500 is recommended in the appropriation for the dissemination of useful information in agriculture.

EXHIBITIONS AND CONTESTS.

The public winter meeting of the Board at Horticultural Hall, Boston, in January brought out a splendid corn and apple show, as well as an exhibit of boys' and girls' club work. There were also exhibits from the Dairy Bureau, the State Ornithologist, and a milk, cream and butter show conducted by the Massachusetts Dairymen's Association. The exhibition as a whole was far and away the best the Board has so far held in connection with its public winter meeting, and interest was evinced by the large attendance all three days of the exhibition.

A special prize of \$25 was offered through the Board by a friend for the best acre of potatoes in the town of Phillipston, and certain other similar prizes were offered in the same way.

Some of the money offered at the dairy show at Amherst was provided by the Board, and a very good show resulted.

The Board as last year offered prizes for a beekeepers' exhibit at the Worcester and Greenfield fairs. Under the direction of Dr. B. N. Gates a very attractive exhibit was gotten together. The orcharding contest was also conducted as in 1915 by the committee on orcharding and fruit growing, and judged by F. Howard Brown with the following results:—

Class 1. Peaches.

No entries.

Class 2. Pears.

Section 1. — For best orchard of not less than 1 acre: First, Fred Steele, Stoneham, \$25; no second prize; third, W. H. Atkins, South Amherst, \$10.

Section 2. — For the best crop from a single tree: First, W. A. Root, Easthampton, \$10; second, J. Corey & Son, Truro, \$5.

Class 3. Apples.

Section 1. — For the best orchard of 1 acre of standard apple trees; trees must have been planted in fall of 1911, spring or fall of 1912 or 1913, or spring of 1914: First, J. H. Hardy, Jr., Littleton, \$25; second, R. L. Everit, Barre, \$15; third, Patten Brothers, Sterling, \$10. (Honorable mention and gratuities of \$5 each, John Chandler, Sterling Junction; J. T. Geer, Three Rivers; W. D. Gleason, Sterling Junction; C. A. Wilson, Medway.)

Section 2. — For the best orchard of not less than 3 acres; trees must have been planted in fall of 1911, spring or fall of 1912 or 1913, or spring of 1914: First, O. C. Searle & Son, Easthampton, \$25; second, John Chandler, Sterling, \$15; third, tie between A. S. Geer, Three Rivers, \$5, and J. M. Burt, East Longmeadow, \$5. (Honorable mention and gratuity, H. A. Dunbar, Richmond, \$5.)

Section 3. — For the best apple orchard in bearing, size of orchard not specified; no trees planted earlier than the fall of 1901 to be eligible: First, Edward F. Belches, Framingham, \$25; second, W. H. Atkins, South Amherst, \$15; third, Cyrus D. Ordway, West Newbury, \$10.

Section 4. — For best old apple orchard renovated: First, O. C. Searle & Son, Southampton, \$25; second, Wright A. Root, Easthampton, \$15; third, Sumner L. Howe, Marlborough, \$10. (Honorable mention and gratuity of \$5 each to Naquag Farm, Rutland; Ralph F. Barnes, Marlborough; the Misses Noyes, Methuen.)

Section 5. — For the best yield of marketable apples from a single tree planted in fall of 1901 or later: First, W. A. Root, Easthampton, \$10; second, W. H. Atkins, South Amherst, \$5.

Section 6. — For best yield of marketable apples from a single tree planted in spring of 1901 or earlier: First, W. H. Atkins, South Amherst, \$10; second, O. C. Searle & Son, Southampton, \$5.

In the class for renovated orchards Mr. O. C. Searle of Southampton had a good record with a yield of 1,200 bushels. In the class for best yield from single pear tree, W. A. Root of Easthampton won with a Clapp's Favorite tree yielding 20 bushels.

In the class for best yield of apples from an old tree W. H.

Atkins of South Amherst carried off first prize, with a yield of 45½ bushels.

In this connection an extract from the report of the judge may be of interest.

We found different troubles more prominent in different sections as was to be expected, red-humped caterpillar being much more plenty in the central and western sections, while, of course, the gypsy moths were plenty in the eastern section, on account of the bad weather during spray time. The results of spraying, so far as gypsy moths were concerned, were largely nullified. . . .

In spite of the shortage of labor this year on all the farms we have never seen finer orchards nor some in better condition.

MEETINGS OF THE BOARD.

The annual meeting of the Board was held in December for the first time, under the amended statute. The routine reports were read, policies adopted and legislative program outlined. The opportunity thus offered the Board to prepare its bills in advance of the convening of the Legislature proved to be of advantage in securing earlier action by that body.

The change in the time of holding the annual meeting made it necessary to adopt other than a December date for the public winter meeting. The fifty-third annual public winter meeting was held, consequently, on January 4, 5 and 6 at Horticultural Hall, Boston. The Massachusetts Horticultural Society, Massachusetts Dairymen's Association, Massachusetts Milk Inspectors' Association and the Massachusetts Alfalfa Growers' Association co-operated with the Board to make this the most successful meeting ever held. The Horticultural Society donated the use of its hall, and the Dairymen's Association took charge of the milk, cream and butter show, and exhibit of dairy appliances. The Dairy Bureau had a striking exhibit showing the food value of milk, and the results of the third annual clean milk contest. The State Ornithologist put up a unique exhibit of means of attracting and protecting birds. The Board conducted the apple and corn shows and an exhibit of its activities and publications and the annual State exhibit of boys' and girls' agricultural club work. In the adjoining room the Milk and Baby Hygiene Association, Boston board of health, and Children's Hospital showed charts and photographs illustrating their work. Motion pictures

of agricultural industries in Massachusetts and elsewhere were introduced between lectures. The lectures and abstracts of the discussions were published in Part II. of the annual report for 1915.

The attendance at the lectures averaged 300, and ranged from 150 to 500. Practically all visited the exhibition hall.

The summer field meeting was held at the farm of Mr. B. W. Crissey, Great Barrington, on Wednesday, June 14. The Housatonic Agricultural Society and the newly formed Berkshire County Farm Bureau co-operated in making the meeting one of the notable agricultural meetings of the year. Some time was spent in examining Mr. Crissey's herd of pure-bred Holstein cattle, and several draft mares with colts from Edgewood Farm and draft stallions from the Flintstone Farm in Dalton. A gasoline farm tractor from Mount Washington was demonstrated as used for plowing. The subjects and speakers were: "Sheep Raising," by C. L. Gold, president, Connecticut Sheep Breeders' Association; "The Functions of a State Department of Markets," by H. A. Emerson, deputy commissioner of the New York Department of Foods and Markets; "Raising Farm Horses," by L. L. Richardson, proprietor of Pine Stock Farm, Leominster; "Soil Improvement," by Dr. Henry G. Bell of the National Soil Fertility League; "The Berkshire County Farm Bureau," by F. E. Peck, county agent for Berkshire County. The Great Barrington Grange served a bounteous dinner.

CHANGES IN THE BOARD.

The following changes have occurred in the personnel of the Board: Mr. David T. Barnard of the Deerfield Valley Society retires after three years of service, and is succeeded by Mr. Stephen W. Hawkes; Mr. John T. Bryan of the Highland Society retires after six years of service, and is succeeded by Mr. Harry A. Ford, who has previously represented the Hillside Society on the Board; Mr. H. S. Packard of the Hillside Society retires after three years of service, and is succeeded by Mr. Milton S. Howes; Mr. Edward H. Waters of the Worcester Society retires after three years of service, and is succeeded by Mr. Charles H. Ellsworth; Mr. James A. Rice of the Worcester West Society retires after three years of service, and is succeeded by Mr. L. H. Ruggles.

WORK OF THE OFFICE.

The work of the office in all directions has shown a normal increase. More inquiries on a wider range of subjects requiring considerable investigation have been received than in other years. Many interviews have been held by the secretary and other officials of the Board. Correspondence is heavier than ever before, and calls for publications exceed the supply. In addition to the continuance of activities carried on in previous years, new functions have necessitated greater efforts and much overtime work by the clerical and stenographic staff, as well as the employment of temporary assistants from time to time. Of these, the administration of the apple grading and white pine blister rust inspection laws, and the preparation of an exhibit of Massachusetts products at the National Dairy Show at Springfield, while involving field work chiefly, have brought greater pressure on the thought and time of the office force. The correspondence, recording and filing necessitated in these new fields have added so much to the normal activities that it will be necessary to add a permanent stenographer another year.

The personnel of the office force has remained the same, except that Mr. Timothy J. Lehane, messenger, left in June for service with the militia. This position has not been filled, but the work has been performed by the employment of Miss Evelyn Towle of Cambridge, a few days a week as needed. A permanent messenger is required, however, if the work of receiving and shipping the publications of the Board is to be done efficiently.

The library is becoming better known and more widely used for reference and circulation. Since the new recording system was put into effect a year ago 85 persons have taken out borrowers' cards and 200 books have been lent. The greatest demand is for publications on fruit, live stock and vegetables. Sixty books and 10 periodicals have been added to the library, while 33 volumes of pamphlets have been bound. Card cataloguing has continued throughout the year. A "visible" index has been purchased. Altogether \$182.56 has been expended for books, periodicals and binding.

EXTRACTS FROM THE TRESPASS LAWS.

Of the cloth posters containing extracts from the trespass laws, 5,000 copies were printed during the fiscal year 1916 at a cost of \$233.41, and this supply just lasted out the year. Five hundred and seventy-three copies have been sold at 5 cents each, the total receipts being \$28.65, an increase over the year 1915 of \$9.85. Money received from the sale of these posters is credited to the Board's appropriation for incidental and contingent expenses. (Of the poultry thieving posters, which contain the law relative to the detention of persons entering poultry houses, 1,000 copies were printed at a cost of \$43.39.)

LEGISLATION OF 1916.

Little new agricultural legislation of importance was passed by the General Court of 1916. Of 13 recommendations submitted by the Board, 6 were enacted into law, and all but 1 of these were amendments to existing legislation. The public market act has been amended, providing that cities and towns may make rules for the government of public markets, subject to the approval of the State Board of Agriculture (chapter 79, General Acts of 1916). Several perfecting amendments to the apple-grading law were passed, the most important of which provided that apples in cold storage shall be subject to inspection. An amendment to the law relating to the membership of the Board of Agriculture was passed whereby the Lieutenant-Governor and Secretary of the Commonwealth are dropped from membership and a representative of the Federation of Farm Bureaus and County Leagues is included. The nursery inspection law was amended so that nursery agents are required to secure licenses, and the nursery inspector is given authority to declare certain plants and shrubs a nuisance and to destroy them without the consent of the owner; \$10,000 was appropriated for the extermination of the white pine blister rust, and transportation companies are required to notify the State Nursery Inspector of importations of certain fruits.

The apiary inspection law was amended so that the apiary inspector now receives a fixed salary of \$500 per year instead of a per diem rate, as before.

The law relating to the Dairy Bureau has been changed so that the Bureau may now spend some of its funds in general work for the improvement of the dairy industry, and the salary of the secretary is now paid from one appropriation instead of his receiving part of his salary as secretary of the Board and part as ex officio of the Bureau, as heretofore (chapter 46, General Acts of 1916).

A resolve was also passed with an appropriation of \$5,000 a year for three years to be used by the Board in the encouragement of the dairy industry. This money has been given to the Dairy Bureau for use in offering prizes along lines similar to the clean milk contests of the past few years.

The following legislative recommendations of the Board failed of passage: a resolve for the purchase of registered stallions by the State; a resolve giving the Board power to collect and circulate information relating to the agricultural resources of the Commonwealth; an act authorizing the appointment of a chief of markets by the State Board of Agriculture; an act increasing the salary of the general agent of the Dairy Bureau from \$1,800 to \$2,300; and an act amending the drainage laws of the Commonwealth.

PUBLICATIONS.

The following publications were issued by the Board during 1916, and may be secured upon application to this office: —

NAME OF PUBLICATION.	Pages.	Number.
Agriculture of Massachusetts, 1915, Part I.,	252	1,500
Agriculture of Massachusetts, 1915, Part II.,	312	6,000
Report of Secretary for 1915, ¹	60	500
A History of the Game Birds, Wild Fowl and Shore Birds of Massachusetts and Adjacent States. ²	636	2,000
Bulletin No. 2, ³ Apple Growing,	256	5,000
Bulletin No. 5, ³ Vegetable Growing,	188	5,000
List of Available Publications,	12	5,000
Circular No. 43, ³ Sewage Disposal in Rural Districts, . .	12	2,500
Circular No. 44, ³ The Sanitary Side of Farm Water Supplies, .	12	3,000
Circular No. 45, ³ The Starling,	24	2,500

¹ Separate from sixty-third annual report. ² Second edition, revised. ³ Fifth edition, revised.

NAME OF PUBLICATION.	Pages.	Number.
Circular No. 47, ¹ Bird Houses and Nesting Boxes,	28	5,000
Circular No. 49, Food Plants to attract Birds and protect Fruit,	24	4,000
Circular No. 50, ¹ Apple Grading and Packing,	28	10,000
Circular No. 53, ² Poultry and Egg Production,	28	7,000
Circular No. 54, ² Standardisation of Farm Products, . . .	12	4,500
Circular No. 55, ² Canning in Glass in the Home,	12	8,000
Circular No. 56, ² Farm Management,	12	4,500
Circular No. 57, ² Milk Inspection from the Producers' Stand- point.	8	4,500
Circular No. 58, ² Utilisation of Surplus Farm Products, . . .	8	4,500
Circular No. 59, ² Rural Credits — their Object,	16	4,500
Circular No. 60, Alfalfa Conditions in New England, . . .	20	4,500
Circular No. 61, Grading Milk,	16	5,000
Circular No. 62, Domestic Science Teaching in Rural Districts,	12	5,000
Economic Biology Bulletin No. 3, Natural Enemies of Birds, .	60	4,000
Nature Leaflet, No. 35, ² Window Gardening,	12	2,000
Nature Leaflet, No. 36, ⁴ Hotbeds,	8	2,000
Nature Leaflet, No. 37, ² How to test Seeds,	4	2,000
Nature Leaflet, No. 38, ² How to Plant,	12	2,000
Nature Leaflet, No. 43, ⁴ Leopard Moth,	4	2,000
Apiary Inspection Bulletin No. 10A, Spraying v. Beekeeping, .	20	300
Fourteenth Annual Report of State Nursery Inspector, . . .	12	500
Sixth Annual Report of State Inspector of Apiaries (Apiary In- spection Bulletin No. 10).	30	1,600
Eighth Annual Report of State Ornithologist,	32	2,500
Twenty-fifth Annual Report of Dairy Bureau,	28	700
Second Annual Report of Boys' and Girls' Club Work, . . .	20	3,000
Directory of Agricultural Organisations,	32	400
Report of Encouragement of Dairying Contests,	12	1,000
Food Value of Milk,	4	95,000
Leaflet, A (Milk),	1	10,000
Breeders and Owners of Registered Pure-bred Dairy Cattle in Massachusetts.	28	1,500
Manual of Agricultural Laws,	196	1,500
White Pine Blister Rust,	4	14,500
List of Institute Speakers,	32	450

¹ Second edition, revised.² Separate from sixty-third annual report.³ Fourth edition.⁴ Third edition.

A change was made during the past year in the printing of "Agriculture of Massachusetts." The volume was divided into two parts, the first part containing the report of the secretary and specialists, and the second part containing the papers de-

livered at the public winter meeting. Of the first part 1,500 copies were printed, and of the second, 6,000, as it was felt that reports of a routine nature were not of as much interest to the general public as the papers and essays which form the substance of the second part of the report. That this is true has been borne out by the comparative public demand for the two parts, and this method of printing the report has resulted in a saving of \$1,400.

Mr. Forbush published two more of his very popular economic biology bulletins during the year, No. 2 being entitled "The Domestic Cat," and No. 3, "The Natural Enemies of Birds." The cat bulletin was published under the auspices of the Board and distributed from its office, but as it was paid for by private subscription it does not appear in the tabulated list of publications. The demand for both these publications has been large, and bespeaks the growing interest in bird life and its relation to man.

The Board also published during the year a large edition of a leaflet on the white pine blister rust. This leaflet described in a non-technical manner the rust and methods of combating it, and contained a colored plate showing different stages of the disease. The plate was furnished by the Massachusetts Forestry Association. An edition of 14,500 of these leaflets was published, and practically all of these have been distributed.

During the year the agricultural laws of the Commonwealth have been compiled and a "Manual of Agricultural Laws" published, which has just come from the press. This pamphlet contains both the statutes relating to agriculture and digests from the principal court decisions thereon. To avoid duplication, however, certain laws affecting agriculture which are contained in other State compilations have been omitted. This is the first time the agricultural laws have been compiled with any degree of completeness, and it is believed that this book will prove useful to many of our citizens.

The by-laws of the Board, which were last published complete in 1894, are in need of codification, and this work will be undertaken during the coming winter.

With reference to the future policy of the Board concerning publications, it seems to the secretary that from now on more of our work should be devoted to such subjects as where, when

and how to market, the standardization of products and the advertisement of the agricultural resources and possibilities of Massachusetts, and the question of farm credit and organization rather than to mere questions of production. Most farmers have no trouble in raising sufficient produce; the trouble is with the disposal. With forty-eight agricultural colleges and the same number of State departments turning out bulletins by the thousand every year on production, as well as the agricultural press and the large publishing houses, it would seem as though this phase of the question was thoroughly taken care of, but we are continually receiving questions such as these: "Where can I buy good land for peach growing in Massachusetts?" "What is land in Sherborn best fitted for?" "Is there much wet land in Massachusetts?" "Where is it?" "What is it worth?" As I have stated earlier in this report, we must do two things, — find out these facts and then publish them. In this way we can reach a thousand prospective purchasers of farm land to one whom we reach in a telephone conversation or by letter.

BULLETINS OF MASSACHUSETTS AGRICULTURE.

A second edition of Bulletin No. 5 on "Vegetable Growing" was reprinted during the year. Three of the articles in the first edition were omitted, and the following new articles added, namely, "Recent Advancement in Market Gardening," by R. L. Watts; "The Value of Experimental Work for Truck Farmers," by T. C. Johnson; "The Home Vegetable Garden," by Alden French; "Potato Growing in Massachusetts," by S. C. Damon; "Onion Growing in the Connecticut Valley," by Leslie R. Smith.

A fifth edition of Bulletin No. 2, "Apple Growing," has also just come from the press. This is, unquestionably, the Board's most popular bulletin. In the new edition several articles which appeared in the fourth edition were left out, and the following new ones included: "Opportunities for Fruit Growing in Massachusetts," by F. C. Sears; "The New Orchard," by F. C. Sears; "The Massachusetts Apple Grading Law," by Wilfrid Wheeler and H. Linwood White. It is planned during the coming year to republish the bulletins on poultry culture and dairying, and, if funds permit, to add a new bulletin to the series, on what subject has not yet been decided.

LEGISLATIVE APPROPRIATIONS.

OBJECT FOR WHICH APPROPRIATED.	1916.	
	Appropriation.	Used.
Administration: —		
Secretary's and first clerk's salaries,	\$4,800	\$4,800 00
Clerks,	5,000	4,990 38
Secretary's travel,	500	463 50
Members' travel,	1,700	1,600 96
Incidentals,	3,000	2,998 09
Printing report and separata,	6,000	4,851 69
Inspection and encouragement: —		
Nursery inspection,	14,000	13,012 68
Suppression of blister rust,	14,000	13,959 81
Apiary inspection,	2,000	1,999 50
State Ornithologist,	2,500	2,498 35
Dissemination,	8,000	7,868 13
Dairy Bureau,	9,800	9,800 00
Encouragement of dairying,	5,000	3,736 10
Encouragement of orcharding,	500	494 10
Bounties to agricultural societies,	30,000	29,482 08
Poultry premium bounties,	2,000	2,000 00
Premiums to children and youths,	2,000	2,000 00
Special exhibitions,	2,000	1,931 45
Massachusetts building at Springfield,	1,500	1,500 00
Exhibit at Springfield,	1,000	999 02

CONCLUSION.

In concluding, the secretary would like to speak on one point which we must be prepared for sooner or later. The Board has now been in existence for sixty-four years, and during that period practically no changes have taken place in the form of organization. We have continued on the line of a plan which has stood the test of time, and while other States have been shifting from one style of organization to another, Massachusetts has kept close to the traditions of those whose vision was farseeing. That the principle has been good is true, but we

must keep in mind that the units of an organization are what make the organization. Our State is changing in its attitude toward agriculture. New organizations are springing up. Many of them will be short-lived; others are bound to go ahead. Many of the older institutions will give place to these new ones. The Board should be quick to grasp the meaning of these changes and demand a standard from its organization here represented that will prevent the continuance on the Board of the society or organization which seems to perform a purely perfunctory duty. Membership here should be from and by only live bodies of men and women working for the upbuilding of the agriculture of Massachusetts. This Board should be the leader in the agricultural activities of the State, and in order to do this should keep in close touch with all progress in agriculture. Farm bureaus and other county and town organizations are constantly discussing matters of importance relative to these questions. The members of the Board are often officers of these bodies or associated with them. Many of the problems which are discussed have to do with the Board's work. It is impossible for the secretary to know of all the questions under discussion in the State, and it should be the duty of the members of the Board to keep his office informed on all matters relating to agriculture in their section. In some sections boards of agriculture require their members to make a monthly report on conditions in their locality. Might it not be advisable to try this out here? With our organization we should be very near to all phases of the work, and a report from the practical farmers of the State would be very valuable.

The opportunity in our State is large. The incentive to do is often lacking. More enthusiasm and inspiration are needed to go with good business judgment to make achievement possible and develop efficiency.

SUMMARY OF RECOMMENDATIONS OF THE STATE BOARD OF AGRICULTURE.

1. That there be established a director of organization and markets of the State Board of Agriculture.
2. That provision be made for the drainage of wet lands for farming purposes.

3. That the State Board of Agriculture and the State Department of Health be authorized jointly to make drainage surveys.

4. That the appropriation for the State inspection of apiaries be increased from \$2,000 to \$3,000.

5. That provision be made for the payment of bounty to poultry associations on a plan similar to that on which bounty is awarded the agricultural societies.

6. That certain perfecting amendments be made to the apple-grading law.

7. That protection be removed from starlings.

8. That the secretary be empowered to employ further assistants, and that the appropriation for this purpose be increased from \$5,000 to \$9,000.

RECOMMENDATIONS OF THE SECRETARY (RELATIVE TO CURRENT APPROPRIATIONS, NOT ACCOMPANIED BY BILLS).

For Action by the Board.

1. That the appropriation for incidental and contingent expenses be increased from \$3,000 to \$3,500.

2. That the maximum appropriation of \$15,000 for State nursery inspection be allowed for the year 1917.

3. That the appropriation for the dissemination of useful information in agriculture be increased from \$8,000 to \$14,500.

4. That the appropriation for printing the annual report be reduced from \$6,000 to \$5,000.

Respectfully submitted,

WILFRID WHEELER,
Secretary.



Showing size of native trees attacked by the blister rust. Over 200 diseased twigs and branches were removed from these large native trees last spring. Since then it has been found necessary to remove some of the large limbs.

FIFTEENTH ANNUAL REPORT
OF THE
STATE NURSERY INSPECTOR.

PRESENTED TO THE BOARD AND ACCEPTED,
DECEMBER 5, 1916.

FIFTEENTH ANNUAL REPORT OF THE STATE NURSERY INSPECTOR.

To the State Board of Agriculture.

I have the honor to present herewith the fifteenth annual report of the State Nursery Inspector.

NURSERY INSPECTION.

For several years the gypsy and brown-tail moths have been present either in a number of nurseries in the State or so near by as to make it possible that these pests could be on nursery stock sent out on fall shipments.

Inspection of the growing stock for other pests and diseases before the fall shipping season was as practicable as ever, but to make this inspection apply to the gypsy and brown-tail moths was impracticable, as the gypsy moth cannot be safely inspected for before the middle of September, and the brown-tail tents cannot in all cases be found before the leaves have fallen, which, with the late holding varieties of trees, is often not until the end of November in this State. To delay all inspection as late as this would mean that there would be no fall shipping by the nurserymen concerned, and would be likely to drive them out of business, and the situation was therefore serious.

At that time the Federal government, recognizing the danger of shipping these pests to other parts of the country, not only on nursery stock but also on stone, lumber, Christmas trees and other commodities, placed a quarantine on the entire infested area, and to supervise the nursery stock placed Federal inspectors at the nurseries. These inspectors examine all stock dug for shipment after it has been brought to the packing shed, plant by plant, and issue shipping tags for each package.

This seemed to open a way in which ample protection could be afforded purchasers of the stock. Accordingly, the usual inspection for all pests and diseases except the gypsy and

brown-tail moths was made, and certificates were issued, knowing that the Federal inspectors would during their plant-by-plant inspection eliminate these insects.

This plan worked out well for two seasons, but last spring the inspection service found that the legality of giving certificates that the nurseries were "apparently free from dangerous insect pests or fungous diseases" was being questioned. The matter was at once referred to the Attorney-General, who ruled that certificates stating that nurseries were "apparently free" when the gypsy or brown-tail moths were present could not be issued, even though the Federal inspection made sure that none of these pests should be sent out on stock.

This decision meant an entire rearrangement of the inspection procedure as hitherto conducted, and after a careful study of the situation only one solution of the problem seemed to be practicable. This was to inspect for everything except the two insects concerned, as before, and to make a special inspection for these as soon as this could be successfully done in the fall. If at this later inspection a nursery proved to be free from pests, the certificate would then be issued.

This solved the inspection problem, but not how the nurserymen could ship stock during the fall, before the second inspection. This difficulty was met by applying the power the inspectors have always had to issue permits for the shipment of single packages of stock found free. As the early inspection takes care of all pests and diseases except the gypsy and brown-tail moths, and as the Federal inspectors have as their sole duty the discovery of these and their removal from all stock shipped, the appointment of these inspectors as State inspectors, also has given them the right to attach State permits to the shipments, so that the nurserymen can carry on their fall trade as before. Nurseries where no Federal inspector is stationed are taken care of in the same way by the State inspectors.

In practice, then, the plan works as follows: all nurseries are inspected before the fall shipping season begins for all pests and diseases except the gypsy and brown-tail moths, but where these last pests are found no certificate is issued. After being dug, stock sold from such a nursery is inspected by a Federal State inspector for these two pests, and if free is shipped under

a permit certifying that the plants in that package are apparently free from pests and diseases. Later, when it becomes possible to do the work, the nurseries are inspected for the moths, and if free from them a certificate is issued. Thereafter the inspection of individual packages becomes unnecessary, so far as the State is concerned, during the life of the certificate, which expires June 30 the following spring. As the spring shipping season ends before either the gypsy or brown-tail moths spread from outside into the nurseries, this plan both meets the requirements of the law and enables the nurserymen to do business, though it greatly increases the work of the inspectors and consequently the cost of the inspection service.

During the present year this method has been followed and the first inspection has been completed. The second is now under way, and should be completed before the end of December, and shipping after inspection of the individual shipments, under special permits, has enabled the nurserymen to fill their orders for fall delivery as usual.

The number of certificates thus far issued is, of course, rather small, but after the second inspection has been completed there is no reason why the usual number should not have been issued.

The first inspection showed the nurseries generally to be in excellent condition, with perhaps less second-grade stock than usual, and for the most part well kept up and cared for. The second inspection thus far indicates fewer gypsy and brown-tail moths present than had been anticipated, and is good evidence that the practice of our best nurserymen of spraying their stock and all surrounding brush or woodland thoroughly each spring is a decidedly profitable one.

One hundred and eighteen agents' licenses have been issued during the past year. Many of the agents are in this business for only a brief period, and no doubt do not know of the existence of any law requiring them to take out a license. Where an agent does business only in a limited territory no knowledge of his activities in this line is liable to reach the authorities in charge, and there are certainly many unlicensed agents in the State in consequence. The section of the law requiring agents to obtain licenses is not entirely satisfactory in its wording, and sooner or later should be changed.

Interstate shipments have varied little in number and quality of stock from former years. Some have been below the Massachusetts standard, and all such when found have either been returned to the shipper or destroyed.

As in other years particular attention has been given to the examination of stock imported from other countries.

Though we already have many insects and diseases which have reached this country and have established themselves here, there is no reason why others should be given an opportunity to enter by failure to examine stock brought in, and every year dangerous insects and diseases are found by the inspectors on imported stock and destroyed. It is probably safe to say that in all probability some of these pests and diseases will reach this country somewhere, perhaps through some State where the inspection is carelessly made, but each year they are kept out is a distinct gain to our agricultural and horticultural interests.

The possibility of the entrance of these foes of man into this country in spite of all protective measures which can be taken is so great that at a recent conference of workers on insect pests and plant diseases it was voted to recommend to the United States Federal Horticultural Board the establishment of an absolute embargo on the importation into this country of all plants except such as the Board, for sufficient reasons, should see fit to exempt from the application of the embargo. Whether this will be adopted by the Board is, of course, not yet known, but it at least indicates the views of a body of men who have given much study to the matter as to the liability of new pests and diseases reaching this country in spite of every precaution which can be taken.

The following report on the import shipments received during the year beginning December 1, 1915, and ending November 30, 1916, indicates the number and sources of the shipments, and the pests and diseases found.

During the year 594 shipments, comprising 5,181 cases, were received. Inspection of 59 of these shipments (263 cases) has not as yet been completed. In fact, most of them have not reached their destinations, having only just arrived in this country. Any pests or diseases found on these cannot therefore be included in this report.

Imported Nursery Stock, December 1, 1915, to December 1, 1916.

	Number of Shipments.	Number of Cases.
Holland,	253	3,166
Belgium,	175	1,409
England,	65	215
Scotland,	36	47
France,	25	75
Ireland,	19	53
Japan,	9	197
Bermuda,	2	4
Azores,	2	3
Canada,	2	2
Brasil,	1	4
Central America,	1	2
Italy,	1	1
Cuba,	1	1
Portugal,	1	1
Nova Scotia,	1	1
Total,	594	5,181

Insects.

Times reported.	NAME.	Found on —	Country.
45	<i>Gracilaria zachrysa</i> Mey. (leaf miner),	Azalea,	Holland, Belgium.
7	<i>Peronea schalleriana</i> L. (leaf webbing species).	Azalea,	Holland, Belgium.
11	<i>Notolophus antiqua</i> (L.) (European Tussock moth).	Rose, magnolia, laburnum, Juniperus virginiana, Azalea mollis.	Holland, Denmark.
2	<i>Phytomyza aquifolii</i> Duf. (Dipterous leaf miner).	Holly,	Holland.
1	<i>Chionaspis salicis</i> L. (scale insect), .	Lilac,	Holland.
22	<i>Lepidosaphes ulmi</i> L. (oyster shell scale.)	Lilac, box, Crataegus, Cornus, Japanese maples, Pyrus malus floribunda.	Denmark, Holland, England.
6	<i>Lecanium</i> sp. (immature) (soft scale insect).	Box, bay, Thuja, Ilex, .	Holland, Belgium, France.
8	<i>Aspidiotus hederæ</i> (Vall.) (ivy scale),	Camellia, bay, palms, .	France, Belgium.
4	<i>Coccus hesperidum</i> (L.) (soft brown scale).	Bay,	Holland, Belgium.
2	<i>Chrysomphalus aonidum</i> (L.) (scale insect).	Kentia,	Belgium.
1	<i>Strophosoma coryli</i> Fab.,	Oak,	Holland.
1	<i>Pontia rapæ</i> (L.) (<i>Chrysalis</i>), (imported cabbage worm).	Azalea mollis,	Holland.

Insects — Concluded.

Times reported.	NAME.	Found on —	Country.
1	<i>Pterostichus vulgaris</i> L. (ground beetle).	Buxus (in packing), . . .	Holland.
1	<i>Carabus granulatus</i> L. (ground beetle).	Juniperus,	Holland.
1	<i>Andricus sieboldii</i> (Htg.) (gall insect),	Oak,	France.
4	<i>Aphididae</i> (plant lice),	Hydrangea, Japanese maple, Euonymus.	Holland, England.
1	<i>Polistes</i> sp. (wasp),	Azalea (in packing), . . .	Holland.
1	<i>Aphodius fimetarius</i> L. (dung beetle),	Rhododendron,	Holland.
1	<i>Capsid</i> (leaf bug),	Azalea (in packing), . . .	Holland.
1	<i>Psocid</i> ,	Juniperus,	Holland.
1	<i>Blattid</i> (cockroach),	In packing of shipment of orchids.	Brazil.
1	<i>Carabus</i> (near) <i>nemoralis</i> Müller (ground beetle).	Box,	Holland.
1	<i>Psychid</i> (empty bag) (bag worm), .	<i>Kalmia latifolia</i> ,	Holland.
1	<i>Elatrid</i> (dead larva) (click beetle), .	Miscellaneous Shipment, .	France.
1	<i>Lepidopterous</i> cocoon (dead), . . .	Peach,	Scotland.
1	<i>Arachnida</i> (egg mass) (spider egg mass).	Rhododendron,	Holland.
2	<i>Acarina</i> (eggs) (mite eggs), . . .	Rose,	Holland.
1	Snail (egg mass),	Azalea,	Holland.

Diseases.

Times reported.	NAME.	Found on —	Country.
5	<i>Bacterium tumefaciens</i> (crown-gall),	<i>Syringa persica rosea</i> , <i>Syringa persica alba</i> , flowering cherry, <i>Prunus</i> , <i>Crataegus</i> .	France, Holland.
1	<i>Pitya cupressi</i> Rehn.,	Juniperus,	Holland.
1	<i>Botrytis lanca</i> (leaf mold), . . .	<i>Laurus</i> (leaves),	Belgium.
1	Leaf spot, ¹	<i>Pyrus malus floribunda</i> , .	Holland.
23	<i>Exobasidium azaleae</i> ,	Azalea,	Belgium, Holland.
	Rust, ²	Azalea,	Belgium.
	Leaf spot, ²	<i>Aucuba</i> (leaf and stem), .	Holland.

¹ Due to physiological causes, not a fungus. — Report of Department of Botany.² Material now in hands of pathological inspector, Federal Horticultural Board, for identification.

Unidentified Insects.

Times reported.	NAME.	Found on —	Country.
	<i>Not able to identify.</i>		
2	Egg masses (did not hatch), . . .	Lilac,	Holland.
1	Cocoon, Lepidopterous? (dead), . .	Scotch Broom,	France.
	<i>Specimens still in Hands of Experts to be determined.</i>		
10	Species Hymenoptera,	- - - -	- - - -
2	Species Diptera,	- - - -	- - - -
10	Species Coleoptera,	- - - -	- - - -
6	Species Lepidoptera,	- - - -	- - - -

A few calls for the examination of places outside of nurseries, believed by their owners to be menaced by the presence of dangerous insects or diseases near by, have been received and attended to.

Spring inspection for the pine shoot moth has been made as heretofore, with encouraging results, the insect being found only in a few cases.

WHITE PINE BLISTER RUST. IN CO-OPERATION WITH THE UNITED STATES BUREAU OF PLANT INDUSTRY.

Last year's report presented a general outline of the situation in Massachusetts as regards this disease so far as it was then known. In brief, the nurseries were all believed to be free from it, and only two sections of the State were known to be generally infected, viz., a portion of Essex County and quite a part of Berkshire County. In addition to these two areas, single plantations here and there were known to be infected, and the trees concerned were being destroyed as the disease showed itself. A few scattered cases of currant infection in southeastern Massachusetts, discovered late in the fall, where no pine infection was known, were problems needing investigation to determine whether they indicated an unknown pine infection in that region, or that the disease had just entered that area on the currants.

The right of the nursery inspection service to take up and investigate this disease outside the nurseries having been questioned, it may be well to state that this has been done under the authority conferred upon the inspector by section 7, chapter 507, of the Acts of 1912, which reads, in part, as follows: —

The state nursery inspector . . . may inspect any orchard . . . or other place where trees, shrubs or other plants are growing out of doors, either on public or private land, which he may know or have reason to suspect is infested with the San José scale or any serious insect pest or plant disease, when in his judgment such pests or diseases are liable to cause financial loss to adjoining owners; and may serve written notice upon the owner . . . or person in charge of trees, shrubs or other plants thus infested, of the presence of such pests or plant diseases, with a statement that they constitute a public nuisance, together with directions to abate the same, giving the methods of treatment for the abatement thereof, and stating a time within which the nuisance must be abated in accordance with the methods given in the notice.

This portion of the law, then, distinctly authorizes efforts by the nursery inspection service to control dangerous insects and diseases throughout the State, and would seem to conclusively settle the question of the right of the nursery inspector to do this work. Moreover, so far as can be ascertained, there is no law permitting any other section of the State government to undertake it.

The question whether this disease is a "serious plant disease" within the terms of the law comes next for consideration, and here an outline of its history in other countries must be given to throw light on this point.

The pine blister rust is probably a native of Europe, and there it apparently originally attacked the Swiss or Stone pine (*Pinus cembra*). When the white pine was introduced into Europe the disease appears to have found in this tree one in which it can thrive even better than in its original host, and it rapidly spread to the white pines established in Europe.

What it has done there on this new host may best be shown by statements of some of the European plant pathologists who have studied it most carefully.

The disease was first observed in Sweden in 1887. Eriksson states that at first it attacked only young trees, but that later



Showing trunk of a fair-sized tree badly diseased.

it also attacked quite large ones. In Finland Hisinger found thirty-year-old trees diseased and finally killed. Klebahn reports that large trees are usually attacked only on the branches. Köhler (1909) found the larger part of the white pines in the Altenburg Park dying from this disease. Somerville, writing of the disease in England, says:

The disease is so much on the increase that it is not too much to say that the outlook in this country for the Weymouth (English name for the American white pine) and other five-leaved American pines is almost hopeless. . . . But it is to be feared that the day is not far distant when it will gain a footing in North America, and if it spreads there as it has done in Europe, the loss that will result through the destruction of one of America's most valuable lumber trees can only be described as appalling.

Ritzema Bos states that the fungus is so prevalent in Holland that the culture of white pine is impossible. Ravn has stated that the white pine would be very successful in Denmark were it not for the attacks of this fungus. The blister rust, however, has resulted in the virtual abandonment of the use of this tree in that country.

The above statements (taken from a United States Department of Agriculture bulletin on the blister rust) indicate that the disease is regarded as a serious one in Europe. Further quotations show that it is most serious on the smaller trees, the loss reaching 100 per. cent in some cases.

Whether the blister rust will be as serious in this country as it is in Europe is the next question. Here, to a certain extent, conclusive evidence is lacking, as the disease has not been here long enough to have had full opportunity to show what it can do. Still, in two or three places it has probably been present for twelve years or so, and some indications as to its effects, though not complete, are significant. As regards old trees the following statements may be of interest.

Dr. Perley Spaulding of the United States Bureau of Plant Industry has probably had more experience with the blister rust than any one else in this country, having studied it ever since it was first discovered here in 1909, and having visited practically all the areas of serious infection many times to

observe the progress of the disease. In a letter dated November 27, 1916, he writes:—

While we have not had the disease long enough in this country to show what it may do in mature white pines, we do have in a few cases very plain indications of what this disease will undoubtedly do either in mature or immature trees. We have instances of young stands of white pine up to twenty or twenty-five years of age where about 40 per cent of the total stand on quarter-acre plots is killed or has the main stem girdled by the disease, which of course means the death of the affected trees within a very few years. In these same cases 85 per cent of the total stand was affected. In the case of one large tree which I have had a chance to watch for several years, where a severe outbreak of the disease was present within 200 feet, I have seen numerous branches 3 and 4 inches in diameter taken off in the effort to remove the diseased parts of the tree. A disease which will do this sort of thing of course may ultimately take every branch off from the tree, no matter how large it may be or how healthy in other respects. There is no doubt that where this disease is allowed to go unchecked it will very seriously threaten the life of *any* white pines that may be in the vicinity, no matter how large or how small. Furthermore, it certainly will, by killing the branches, utterly destroy the beauty of valued ornamental trees by making them unsightly and by destroying the regularity of their branches, which is the great charm of this species. A large tree which once becomes infected in its branches cannot be thoroughly inspected for the disease, and for this reason efforts to cut out the diseased branches in a large tree are not only futile but are foolish. The result in such cases is that scattering infections remain in the top of the tree where spores are produced, which because of their height from the ground obtain a maximum distribution in the wind. Such trees are the most dangerous centers for the disease that we have to contend with. The oldest outbreaks of the disease of which we know in this country date back only some twelve years so far as we can judge from what is left within those infected areas. If within this time we may get dozens of 3 and 4 inch branches taken out of a tree 50 to 60 feet in height, what may be expected after the disease has been in the locality twenty years?

Dr. J. F. Martin has had immediate supervision of the field work on the rust in Massachusetts during the year, and from his observations in the field presents the following statement:—

While the disease has not been present in Massachusetts long enough to kill mature trees, it has given plenty of evidence of what it can do and what its ultimate effect upon such trees will be. At Lenox and Ipswich several trees ranging from 1 to 2 feet in diameter at the base

were found with the twigs and branches badly diseased. They were growing under different environmental conditions; some in wild woodland, others on the lawns of large estates serving an ornamental purpose, receiving excellent care and valued very highly. These trees were entirely free from other pests, and evidently in a very vigorous and healthy condition before this disease reached them. It was not uncommon to cut from 100 to 200 diseased parts from such a tree, the infected parts ranging from tiny twigs to limbs 6 inches in diameter. In one case at Ipswich, a tree 1 foot in diameter at the base was found with the disease "fruiting" on the trunk about 10 feet above the ground. At South Weymouth large native trees were found with diseased branches. At Rehoboth trees varying from 10 to 35 or 40 feet in height were badly infected, the smaller ones usually being diseased at the base, while the larger ones had infected branches of various dimensions, and in some cases the main trunk was girdled by the disease about 10 feet from the top. It was estimated that the infection had been present at this particular spot about seven years. The above facts indicate very plainly what effect this disease will have on our pine trees both large and small if time enough for its full development be given.

On small trees the injury is extremely serious. No tree under twenty years of age (or, in fact, of any age) has so far been found which has recovered from the disease. Where the attack is on the trunk, girdling ultimately results in the death of the tree. On a limb the disease girdles it and then generally works back to the trunk and attacks that. The condition of thousands of young pines examined during the last five years amply attests this statement. If old pines in this country are crippled and young trees are killed, and no trees are known which have recovered, it would seem conclusive that the blister rust is a "serious plant disease . . . liable to cause financial loss" within the terms of the law, and that to declare it a public nuisance is entirely justified.

It is only fair to state that two or three foresters and plant pathologists in this country doubt if the disease will ever become so serious as to require radical measures for its control. On the other hand, those who have had the most experience working with the disease in the field are all convinced that it is a serious menace to the white pines of this country. At a recent meeting in Albany, New York, of foresters, nursery inspectors and others who have had charge of the work of ascertaining conditions in the different States and in Canada,

where over forty workers from New Hampshire to Minnesota and from Canada to Virginia were present, it seemed to be the general consensus of opinion that the further planting of white pine, at least for a period of years, should not be advised.

Explanation of Map. — The accompanying map represents the distribution of the white pine blister rust as found in Massachusetts in 1916, and is not to be interpreted as indicating the present status of the disease, as practically all diseased pine and diseased cultivated *Ribes* found have been removed. In addition, the wild *Ribes* (of which there were thousands) have been pulled up in the three areas marked on the map by cross lines. It is interesting to note the many towns in which five or less infected places were found. There is undoubtedly considerable blister rust still in Massachusetts, but the State has been freed from this disease as far as was possible with the limited means at command. As a result of this year's work very little, if any, disease exists outside of the three generally infected areas outlined in this report, but there is no doubt some infection which at present is in an unrecognizable form. Although in the three general areas referred to above an attempt has been made to remove all pine and *Ribes* found diseased, more blister rust undoubtedly exists in these regions in the incubation period, and very likely there is some elsewhere which has not been discovered as yet.

Work during 1916 in Massachusetts. — The conditions found in 1915 were reported to the Legislature last winter, and an appropriation of \$10,000 was made for the purpose of learning the condition of the entire State as regards the blister rust, and for its extermination so far as this could be accomplished, and the work was placed with the State nursery inspection service.

As soon as it was possible to begin work and obtain men trained to recognize the disease, crews were placed in Essex and Berkshire counties, some of the men removing all cases of the disease found, while others scouted adjacent territory to locate the rust for the rest of the crew to remove as they came along.

Before the field work began the Federal Congress appropriated \$30,000 for work on the rust in different parts of the United States, and a sum practically equivalent to that appropriated by the State was made available for use in Massa-

chusetts. A co-operative agreement with the Bureau of Plant Industry in charge of the government work was made, by which the salaries of most of the men employed by the State were paid by the United States, while their expenses were paid by the State. In addition the Bureau furnished three scouts, entirely at its own expense, to cover the State as far as possible and ascertain the conditions existing.

Early work, therefore, was divided between scouting and elimination work. Later, when the disease began to make its appearance on the currants, it became evident that the rust was far more widely distributed than any one had supposed. The problematical area in southeastern Massachusetts proved to be generally infected by the disease, and everywhere its location by the scouts was a slow process, so much ground had to be covered.

It finally appeared that if the distribution of the blister rust in the State was to be determined, all exterminative work must cease for a time, and the entire force be turned to scouting. Accordingly this was done, and every town in the State was inspected for the disease.

It is manifestly impossible in such work as this to examine every pine, currant and gooseberry to be found. It was therefore decided, perhaps somewhat arbitrarily, that infections less than 5 miles apart should be regarded as signifying continuous infection, and currants and pines were examined at about half-mile intervals along all the main roads in the towns, and in cases where fuller knowledge of conditions seemed desirable the byroads and woods were also examined to some extent. Plantations where the disease had been found and those where the conditions were unknown were also gone over, and their surroundings for a long distance in every direction were scouted.

While this work was not intended as exterminative in its nature, the scouts in every case where the disease was found reported it to the owner of the property, requesting him to destroy the plants infected, and in many cases did this themselves by his permission. In the statements which follow, therefore, the places infected represent the conditions as found rather than those existing when the scouts left the town.

Conditions found. — The blister rust, either on pines, currants and gooseberries, or on both, was found in 209 towns and cities. Infected pines were found in 45 towns, 3 of which were only suspicious places. Infected currants (or gooseberries) were found in 205 towns, the number of bushes infected ranging from one to thousands.

Three large areas in the State appear to have continuous infection. These may be termed the Berkshire, the Essex and the Plymouth County areas. In the first area diseased pines were found in 8 towns; in the second, in 13; and in the third, in 11. The other pine infections are isolated spots.

The Berkshire area may be described as occupying the southwest corner of the State and extending north to or into the towns of Hancock, Pittsfield and Washington, thence along the line of the Boston & Albany Railroad east nearly to Westfield, then turning south through Southwick to the State line. Some of the towns next outside this line have infections, but most at least of these can be traced to sources outside the area above indicated.

The Essex area includes practically all the towns in Essex County and a few in Middlesex. The towns next to this area, in which no infection has been found thus far, are Salem, Peabody, Lynn, Saugus, Malden, Winchester, Stoneham, Woburn, Burlington, Billerica, Lowell and Dracut.

In the Plymouth area the most northerly towns found infected are Bellingham, Franklin, Norfolk, Walpole, Canton, Milton and Quincy; and from here to the Rhode Island line, Buzzards Bay and the Atlantic Ocean on the east, every town has more or less infection, though the places where the disease is present are often considerably distant from each other, so that the southern limit of the continuously infected area is probably from the eastern edge of Fall River north to the northern edge of Middleborough, thence easterly to the shore, at the southern edge of Kingston.

The other places where infections occur can for the most part be traced to plantations of diseased pines started a number of years ago, from which the trouble has spread locally. In some cases currant infection, far from any pines found diseased, have been the cause of much perplexity, but will

probably be cleared up when a sufficiently thorough inspection can be made in the vicinity of these spots.

Before the State had been completely scouted the appropriation became exhausted, and the Governor and Council were apprised of the situation. After a hearing, at which the matter was fully presented, it was referred to the office of the Supervisor of Administration for more complete investigation. A representative of that office went into the subject carefully, consulting the deputy located at the State House, and visiting places where the work of the disease was evident, and presented his report which resulted in the appropriation from contingent funds of \$3,000 for the further prosecution of the investigation. Approximately \$1,000 has been expended from the nursery inspection appropriation in determining the conditions in and around the nurseries, making a total expenditure from State funds of nearly \$14,000. The United States during this year, I am informed, has expended about \$12,000 in the State in scouting and as wages to State workers, making a total of between \$25,000 and \$26,000 in all.

Too much cannot be said in commendation of the co-operation received from the Federal government. The situation proved to be so far beyond what was anticipated that the State funds alone would have been entirely inadequate to cope with it. Last year our knowledge of the disease, except in the Berkshire area, was derived almost entirely from cases brought to our attention either by inquiries as to the cause of unhealthy plants or cases seen by the inspectors in the course of their work. Even with this knowledge only, the situation looked dangerous. Now, with the results of scouting in every town in the State available, it is much more serious, and had it not been for the assistance received from the United States Bureau of Plant Industry it would have been impossible to have covered the entire State and learn the facts.

A more detailed statement of the work performed is given below, in order that a better idea may be obtained of what has been accomplished.

In the towns of Lenox, Lee and Stockbridge an area of about 60 square miles was thoroughly worked, and all wild *Ribes* (currants and gooseberries) found were removed. Approxi-

mately 30,000 were pulled up, of which 10,000 were diseased. All infected cultivated *Ribes* within this area were also removed. Pine infections were present on large native trees and on small growth. Wherever such cases were found the whole tree or the diseased parts were removed as was deemed necessary.

Similar work was performed at Ipswich, Topsfield and Hamilton and also at one place in Newburyport. In this region an area of about 40 square miles was thoroughly worked, and wild *Ribes*, aggregating in round numbers 17,500 plants, were pulled up. Of these, about one-third showed blister rust infection. Pine infection was found quite plentiful, and several thousand trees and parts of trees were destroyed in an attempt to put the trees in such a condition that there would be no immediate danger of their spreading the disease.

During the summer the rust was found to be present along the New York-Massachusetts State line, and in co-operation with the New York State authorities an attempt was made to check its further spread. Investigation showed that there were practically no wild *Ribes* along the State line in the town of Mount Washington. From this town north along the State line a strip 2 miles wide by 25 to 30 miles long was thoroughly covered by a New York and a Massachusetts crew. In round numbers, 11,200 wild *Ribes* were removed from the Massachusetts side of the line, and of these 2,380 were diseased. This work was discontinued after three weeks, as it became necessary to transfer all the men from elimination work in order to complete the scouting of the State.

During the year 250 estates and pine plantations were examined, 81 of which had infected pines. Some of these places were previously known to be diseased, while several others were discovered this year. Wherever diseased pines were found they were removed, and the surrounding country for a radius of 500 yards was thoroughly examined and all wild *Ribes* pulled up. A letter was sent to all the tree wardens in the State requesting the names and addresses of owners of planted pines in their respective towns. Many replies were received, and every planting learned of in this way was visited and inspected. In addition, several pine plantations not previously known to the in-

spectors were found and examined while scouting the different towns for diseased *Ribes*. A total of 1,039,909 planted pines were examined and found to be free from disease; also several acres of native pines of all ages were inspected, some of which showed infection.

Scouting the entire State for the rust necessitated the visiting of several thousand places and the examination of thousands of cultivated *Ribes*. There were 1,284 places which had diseased cultivated *Ribes*, and this figure does not include those found within the areas where complete elimination of all *Ribes* was attempted. In a few cases it was necessary to serve a notice ordering the removal of the diseased bushes. It was impossible to visit all of these places again to see if the notice was carried out, but this was done in many places, and in practically every case the bushes had been destroyed. It seems safe to assume, therefore, that most of the people complied with the law in this respect, and that the majority of the cultivated currants found infected this year have been destroyed.

A total of 41,431 separate diseased pine trees or parts of trees were removed during the past year. In some cases 150 to 200 infected twigs and branches were cut off of a single 20-foot tree. In one case 194 diseased parts were removed from 30 large native trees; 200 were cut from 40 trees and 227 from 20 trees, etc. Many diseased trees and parts of trees were removed after the "fruiting" period of the pine had passed, but in Essex County alone, where considerable pine inspection was done at this time of the year, 9,722 "fruiters" were found and removed. The above figures give a further idea of the capabilities of this disease in its attack upon the white pine. Besides the white pine, one *Pinus flexilis*, one *Pinus cembra* and one *Pinus Sp.* (?) were found infected during the past year in Massachusetts.

It was of interest to note that in a great many cases the soft, swollen, diseased bark of infected pines was more or less chewed off, presumably by squirrels or mice. These animals are perhaps attracted by the soft bark and the sweet pycnidial juices produced by the disease.

On an estate in Massachusetts several young native pine seedlings were inspected on July 6 and no trace of the rust

could be found. They were again inspected eight weeks later, and several trees were found badly infected with the disease. This indicates that the disease develops very rapidly in the bark during the summer preceding the spring when it will fruit, and that by inspecting pines in the fall, which is practical with trained men, and removing the swollen, diseased parts, the spreading of millions of spores to the currants and gooseberries in the spring will thereby be prevented. Therefore all the infected plantations located outside the generally infected areas, and some of the plantings and estates having diseased trees within these areas, were reinspected. Fifteen estates and plantings were re-examined in this way, and on 13 of these 2,989 diseased trees and parts of trees were destroyed. Where not previously done, the country surrounding these diseased plantings was thoroughly covered for a radius of 2 miles, and all wild *Ribes* found were pulled up.

The following is a list of different kinds of *Ribes*, arranged in their order of susceptibility, as determined from field observations during the year: —

Cultivated black currant.

Common wild gooseberry.

Cultivated red currant

Wild black currant

Wild red currant

Flowering currant.

Cultivated gooseberries.

Data obtained on white currants insufficient to enable classification.

} About equally susceptible.

The rust appeared on black currants many miles from other diseased *Ribes* and from any known pine infections. It is difficult to account for this unless we admit that the wind will carry the spores long distances, or that pine infection exists near by which has not been found.

The disease appears to work much faster upon the pines in the coastal region than in the Berkshires, although the ultimate effect upon them is the same. Rapid spread of the disease has been observed through thinly settled country, mixed woods, low lands and valleys, due, in part at least, to the unusual abundance of wild and cultivated *Ribes*. The rust seems to



Showing native thicket of young pine about 10 to 12 feet in height at Rehoboth, Massachusetts. The white tags indicate diseased trees, most of which are infected on the main trunk near the base.



Large native tree which was badly infected with the blister rust. The pile of brush in the foreground is made up of diseased twigs and branches of various sizes cut out of this tree.

follow the valleys where they occur and its direction of spread is probably determined to a large extent by the wind currents. The spraying of *Ribes* for this fungus is not practicable. It has been discussed in other bulletins on the subject and need not be taken up here. Mountains appear to form a partial, local barrier to the disease depending on flora, height, etc.

General results seem to indicate that the spores produced on pines may spread some distance to currants; that the spores produced on the currants during the summer are capable of being carried several miles in each generation, and that the spread of fall currant spores to pine is effective for a comparatively short distance only.

In 1916 the earliest date on which the summer stage of the blister rust was found on currant leaves was June 5. The fall stage was first found upon the currant on June 23. This discovery of the early formation of the teliospores shows that pines might have become infected this year at any time after June 23 until the leaves fall from the currants and gooseberries.

During the scouting it was learned that wild *Ribes* were extremely plentiful in many parts of Berkshire and Essex counties. In some cases as many as 5,000 were removed from a single estate. In central and southeastern Massachusetts they were very scarce except, perhaps, in spots here and there. These data should prove of great value in attempting further work in the control of this disease.

Throughout the State during the past year many pine trees have been seriously troubled by a gradual browning, and sometimes the ultimate dying of the needles. Many specimens and inquiries have come in, asking if this trouble was caused by the blister rust. In this connection it is well to remember that the latter is strictly a bark disease which girdles the limb or tree affected, finally killing it, and does not directly affect the needles. It is difficult to say exactly what causes the browning and dying of the needles, but it is generally agreed to be of a physiological nature and is probably due to a combination of causes. One explanation is that weather conditions the past year were of such a nature as to produce rapid but soft and tender growth. As a result the delicate young needles of many trees were burned by the intense rays of the sun. Where this

burning was severe the needles were unable to recover, and gradually died. Another explanation is that the sapwood of the trunk becomes injured during the winter, due probably to an alternate freezing and thawing at exposed points of the trunk. If the tree has been weakened in any way it would be more susceptible to this winter injury. The latter causes the death of a portion of the sapwood, thereby producing a partial shortage of the supply of water from the roots to the top. This however, is not sufficient to affect the tree until very hot weather sets in, at which time the full supply of water is necessary for the needs of the tree. The result is a browning or dying of the needles.

A few trees die from the effects of this trouble, but most of them recover their normal condition after a year or two. No known method of treatment can be suggested which will help in any way to relieve this trouble.

A fungous disease of pine known as *Phoma* (*Fusicoccum*) sp. has been observed in various parts of the State, but it never becomes very serious except locally. It is often mistaken for the blister rust, which it resembles very much in some stages, and is usually found on low, moist ground. If occurring on high ground, the diseased trees are generally present in gullies or depressions, where they receive the wash from adjoining slopes. The disease attacks the bark, girdling small trees near the base and killing them, but seems to have very little or no effect upon large trees. The diseased bark becomes black, sunken and constricted. Small black pycnidia are formed, which produce spores capable of infecting other trees.

Other States which are affected with the blister rust have taken active steps during the past year to learn the exact conditions of this disease within their borders. In so far as was possible they have attempted to eliminate diseased pines and *Ribes*, and to co-operate with neighboring States in the work. Further concerted efforts to control this disease are to be pursued actively by the various States concerned and by the Bureau of Plant Industry of the United States Department of Agriculture during the coming year.

If further work in the control of the blister rust is carried on next year it is extremely important and advisable that some

funds be made available for carrying on experimental investigations. This is necessary in order to clear up as soon as possible some obscure points, upon which future methods of control may largely depend. The question as to whether the spores will winter over on black currants needs further investigation; also more definite information on the exact distance the spores can be carried by the wind from pines to currants and *vice versa* is highly desirable. Until these points can be ascertained the present methods of control and eradication should be vigorously pursued.

In one regard the work on the blister rust in the State this year may, in the opinion of the inspector, fairly be open to criticism. The practice of cutting off infected twigs and limbs on large trees, rather than cutting the entire tree, deserves some explanation. It was well understood from the beginning that the removal of evident infected places only on a tree would be liable to result in leaving behind others not then perceptible but which would develop later. Yet the primary purpose of any treatment was to remove all "fruiting" places as soon as possible, so that the spores would be destroyed before they could scatter and reach any currants.

The cutting-off method was made use of only where the trees concerned were ornamental trees on residential estates. Elsewhere the tree as a whole was cut. On the estates the entire destruction of the infected trees would in many cases have been vigorously opposed by their owners, with applications for the hearings provided for by the law, and also by the issuing of injunctions to prevent their being cut. While these possibilities were not feared by the inspector he did greatly fear that the resulting delay would permit the scattering of the spores from the fruiting places without any possibility of preventing this, and his first aim was to check the spread of the disease. When by cutting out "fruiting" places, therefore, he could check the spread of the disease, while if, on the other hand, an attempt to destroy the entire tree would mean that he would be unable to work on the "fruiting" places even, until too late to prevent the distribution of the spores, it seemed that cutting out was the best policy to pursue.

RETROSPECT.

The first nursery inspection bill in Massachusetts became a law June 19, 1902. At that time such a law was desired for the better protection of purchasers of nursery stock, and by the nurserymen in order that they might ship stock to other States, most of which had laws requiring that stock shipped there should bear official certificates of inspection, which up to this time Massachusetts nurserymen were unable to obtain, no one having the authority to make inspections and issue the certificates.

At the time this law was passed only 32 nurseries, mostly small, were known to exist in the State, and an appropriation of \$1,000 was considered ample for the work. The inspection of one nursery, however, frequently brought out the fact that there were several others in the neighborhood, and before the first inspection season had ended, 80 nurseries had been examined.

At first the work was limited to an early fall inspection of the growing stock at the nurseries and the destruction or fumigation of all infested or infected plants. As the number of nurseries increased, and the old ones grew larger, the work involved rapidly became greater.

In 1915 only eleven months were covered by the report, due to the changing of the date of the annual business meeting of the Board of Agriculture. During this period the effect of the European war on the importation of nursery stock was felt to some extent, though Massachusetts still ranked fourth in the list of States receiving nursery stock from abroad. During the eleven months of 1915 covered by the report 3,854 cases were received.

Special inspection during the spring for the European pine shoot moth first became necessary at this time, but as few of these insects were found it was hoped that this pest could be checked before becoming established. The Legislature during this year added the duty of inspecting imported fruit of kinds which also grow out of doors in this State to the inspection service, but because of the war practically none was brought in.

Inspection of the stock growing in the nurseries at 163 places was made; 120 agents' licenses were issued, and interstate shipments were examined as far as possible.

The blister rust on further investigation proved to be more widely distributed than had been supposed, and considerable time was devoted to gathering information as to the localities where the disease is found.

The situation as regards this disease proved so serious that it was laid before the Legislature, and an appropriation was made for the investigation of the rust in the State and its control as far as possible. The results of this work are given elsewhere in this report.

During the fifteen years the nursery inspection service has been in existence it has increased from a work employing three men for perhaps a month each to one requiring the entire time of two or three men and the employment during the busy seasons of from ten to thirty workers. When it was established it was recognized as calling for the partial time during three or four months of one man. Now its supervision alone is all that one man should attempt.

The writer has seen the work develop for this period, and has endeavored to carry it as a side issue to his regular occupation. But now it has reached a stage when this arrangement is no longer wise. For the best interests of the service it seems to the inspector that the time is near at hand when an inspector should be appointed who could give his entire attention to the many duties which are required, and he therefore suggests that this should be given consideration, and plans laid to make this change at least within a year or two.

FINANCIAL STATEMENT.

Nursery Inspection.

Appropriation,		\$14,000 00
Compensation of inspectors,	\$6,069 02	
Traveling and necessary expenses,	6,186 06	
Supplies (postage, printing, etc.),	207 60	
Clerical services,	50 00	
Salary, chief inspector,	500 00	
	<hr/>	\$13,012 68

Blister Rust Work.

Appropriation,	\$10,000 00	
From Governor and Council,	4,000 00	
	<hr/>	\$14,000 00
Compensation of inspectors,	\$5,605 38	
Traveling and necessary expenses,	8,201 37	
Supplies (postage, printing, etc.),	141 31	
Clerical services,	11 75	
	<hr/>	\$13,959 81

For the efficient supervision of the inspection work in the eastern district of the State the inspector is greatly indebted to the first deputy, Mr. R. H. Allen. The detailed work, laying out the work and following up of the results on the blister rust has been in charge of Dr. J. F. Martin, who has also assisted in the preparation of a portion of this report, and whose unsparing efforts to thoroughly complete a task much greater than had been anticipated have been largely responsible for the satisfactory results obtained, — so satisfactory, in fact, that blister rust workers from several other States have visited Massachusetts in order to learn how the work was being done.

To both of these gentlemen and to the secretary of the Board, who has given freely of his valuable advice and counsel, the thanks of the inspector are offered. Without their assistance little could have been accomplished.

H. T. FERNALD,
State Nursery Inspector.

AMHERST, December 1, 1916.

APPENDIX.

LIST OF MASSACHUSETTS NURSERYMEN DECEMBER 1, 1916.

- Adams, J. W., Springfield and Westfield.¹
Alexander, J. K., East Bridgewater.
Allanach, John, Marion.
American Forestry Company, Framingham.
Arnold Arboretum, Jamaica Plain.²
Atkins, P. A., Pleasant Lake.
Atwater, C. W., Agawam.
- Bailey, L. H., West Newbury.³
Barker, L. W., Hanson.
Barr, George L., Worcester.
Barrett, M. W., Hyde Park.
Barrows, H. E., Brockton.
Bay State Nurseries, North Abington and Rockland.¹
Bemis, A. L., Worcester.
Bigelow, Palmer W., North Grafton.
Borges, M. J., Jr., Fall River.
Boston & Maine Nurseries, South Lawrence and Lowell Junction.¹
Bowen, W. B., Whitman.
Brandley, James, Walpole.
Breck-Robinson Nursery Company, Lexington.
Breed, E. W., Clinton and South Lancaster.¹
Briggs, L. H., Smith's Ferry.
Brightman, William E., Westport.³
Brown, John A., Concord.
Brown, P. S., Scituate.
- Canning, E. J., Northampton.
Carr, Charles, Dighton.
Casey, C., Melrose.
Chaffee Brothers, Oxford.
Chase, Henry, North Springfield.
Clapp, E. B., Dorchester.
Clark, G. A., Waltham Highlands.

¹ Two nurseries.² Three nurseries.³ Small fruits.

Cogger, Thomas, Melrose.
Continental Nurseries, Franklin.
Coskery, Elmer, Newburyport.
Crosby, H. M., North Harwich.

Davenport, A. M., Watertown.¹
De l'Etoile, Wilfred, Westwood.²
Dickinson, E. F., Billerica.
Dighton Nurseries, Dighton.
Dix, Irving W., Clinton.
Dove, Paul, Wellesley.
Draper, James E., Shrewsbury.
Drew Orchards, Sutton.
Dwyer, E. F., & Son, Lynn.

Eager, George B., Wakefield.
Eastern Nurseries, Holliston.
Elliott, W. H., Brighton.¹

Farquhar, R. & J., Osterville, Dedham and Sharon Heights.³
Fessenden, B. & A., Townsend.
Ford, J. P., East Weymouth.
Foster, Fred W., Administrator (estate of C. H. Tebbetts) East Walpole.
Framingham Nurseries, Framingham.
Franklin Field Nurseries, Boston.
Franklin Forestry Company, Colrain.
Frazer, William R., Northborough.
Frost, G. Howard, West Newton.

Gallivan Brothers, Smith's Ferry.
Gates, W. A., Needham.
Gilbert, A. L., Springfield.
Gowing, J. D., North Reading.²
Gray, M. F., Mattapan.
Greaton, C. H., Abbott's Run.

Haendler, Max, South Natick.
Hallen, C. E., East Dedham.
Hamlin, Nathan B., Ponkapoag.
Hare, Arthur W., North Grafton.
Harvard Forestry School, Petersham, N. H.
Haverhill Water Works, Haverhill.
Heurlin, Julius, Braintree.
Hill, Clarence, Seekonk.

¹ Greenhouse stock.

² Small fruits.

³ Three nurseries.

Hitchcock, E. M., Agawam.¹
Horticultural Company, Worcester.
Howard, J. W., Somerville and Woburn.²
Huebner, H., Groton.
Hughson, L. T., Dorchester.

Jack, J. G., East Walpole.
Jahn, H. A., New Bedford.
Jenness, W. H., Roslindale.
Jennison, W. C., Natick.
Johnson, E. C., Newburyport.

Kakihara, Mrs. H., South Lowell.
Kameyama & Serada, North Cambridge.
Keene, C. R., Cohasset.
Kelsey, Harlan P., Boxford.
Kempton, Clifford, Longmeadow.¹
Kent, R. R., Auburndale.
King, B., Tewksbury.¹
King, R. B., Nantucket.
Kirkpatrick, George S., Winchester.

Lamke, H. J., Pittsfield.
Lawrence, H. V., Falmouth.
Leuthy, A., Roslindale.²
Linde, Charles, Campello.
Littlefield & Wyman, North Abington.⁴

MacGregor, James, Braintree.
Mann, C. W., Methuen.
Mann, H. W., Stoughton.
Manning, J. W., Reading.
Margeson, I. I., Westwood.
McCormack, J. J., Malden.
McLaren, A., Westwood.
McManmon, J. J., Dracut.
Merritt, Charles, South Weymouth.
Miller, W. & Sons, Lynn.
Murray, Peter, Fairhaven.

New England Nurseries, Bedford.
Newell, C. F., West Newbury.
North Shore Fernery Company, Beverly.³
North Shore Nursery Company, Beverly Farms.
North Wilmington Nurseries, North Wilmington.

¹ Small fruits.² Two nurseries.³ Greenhouse stock.⁴ Three nurseries.

Old Colony Nurseries, Plymouth.

Paillet, August, Montague.

Palmer, F. E., Brookline.

Parker, James G., Concord.

Paul Revere Nurseries, Concord.

Pease, Charles, Salem.

Peckham Floral Company, Fairhaven.

Phelps, F. H., Lee.

Pomeroy, Edward A., Gloucester.

Pratt, C. S., Athol.¹

Price, R. T., Lawrence.

Prideaux, F., Swampscott.

Pulsifer, C. Y., Gloucester.

Quinn, James, Brookline.

Rea, F. J., Norwood.

Reynolds, John, Milton.

Richards, E. A., Greenfield.

Riley, Charles M., New Bedford.

Ryan, H. A., Inc., Cambridge.

Robbins, H. W., Littleton.

Robinson, L. D., Springfield.

Robinson's Sons, D., Everett.

Sawyer, F. P., Clinton.

Shaw, F. H., Rockland.

Sinclair, C. H., Smith's Ferry.

Smith, George N., Wellesley Hills.

Southwick Nurseries, Southwick.

Southworth Brothers, Beverly.

Spinney, Frank W., Haverhill.

State Forestry Department, Amherst, Barnstable and Titicut.²

Stearns, L. C., Bridgewater.

Stevens, Abel, Wellesley.

Story, A. T., Taunton.

Sylvester, George F., South Hanover.

Sylvia, M. B., New Bedford.

Thurlow's Sons, T. C., Inc., West Newbury.

Toomey, M. T., Wadsworth.

Turner, C. B., Stoughton.

Turner Hill Farm, Ipswich.

Tuttle, A. M., Melrose Highlands and Wakefield.³

¹ Small fruits.

² Three nurseries.

³ Two nurseries.

Volante, Peter, Newton Highlands.

Walsh, M. H., Woods Hole.

Ward, Ralph M., Beverly.

West Side Nurseries, Worcester and Auburn.¹

Wheeler, Wilfrid, Concord.²

Whitaker, W. E., Clarksburg.

Whitcomb, F. W., Holbrook.

White, A. T., Clifford.

Winchendon Nurseries, Winchendon.

Winthrop Gardens, Holliston.

Woodhouse, R. H., New Bedford.

Wright, George B., Chelmsford.

Yetter, F. J., Greenfield.

¹ Two nurseries.

² Small fruits.



FEEDING STATION AT "THE KATY DID," PORT CLYDE, MAINE.
Note cat guard on the post. (Photograph by courtesy of Mrs. Kate Denig Tower.)

NINTH ANNUAL REPORT
OF THE
STATE ORNITHOLOGIST.

PRESENTED TO THE BOARD AND ACCEPTED,
DECEMBER 6, 1916.

NINTH ANNUAL REPORT OF THE STATE ORNITHOLOGIST.

To the Honorable Massachusetts State Board of Agriculture.

GENTLEMEN: — The interest in birds, in their utility and in the means for attracting and protecting them grows constantly; therefore the year has been marked by increased demands on the State Ornithologist, and it is no longer possible for any one man to meet those demands. During the year much necessary work was begun that could not be finished, and much more had to be deferred.

WORK OF THE YEAR.

Much time has been taken in replying to correspondents who want to know many things, ranging from how long different species of birds live to how many birds there are in the world. All questions are willingly and cheerfully answered whenever an accurate answer is possible. Individuals, municipal, school or college authorities and park commissioners apply in numbers for advice regarding the best means of attracting birds to home, college, school or park grounds. This usually requires a visit to the grounds, personal inspection and advice and often a written report.

Much information regarding the distribution of Massachusetts birds has been secured during the year by personal investigation and through correspondence.

PUBLICATIONS OF THE YEAR.

Special Report.

- Mar. 31. A History of the Game Birds, Wild Fowl and Shore Birds of Massachusetts and Adjacent States, 621 pages. Illustrated with colored frontispiece, 36 half-tone plates and 114 line cuts. Second edition, revised and enlarged. This was noted as "in press" in the last annual report of the State Ornithologist.

Bulletins and Circulars.

- Mar. 14. Circular No. 45. The Starling, 23 pages. Frontispiece. Second edition.
- Mar. 31. Economic Biology, Bulletin No. 2. The Domestic Cat: Bird Killer and Destroyer of Useful Wild Life; Means of Utilizing and Controlling it, 112 pages. Illustrated with 26 half-tone plates and 24 line cuts.
- Aug. 2. The same. Second edition, printed on lighter paper to save postage.
- Aug. 12. Circular No. 49. Food Plants to attract Birds and Protect Fruit, 21 pages. Illustrated with 7 line cuts.
- Oct. 16. Economic Biology, Bulletin No. 3. The Natural Enemies of Birds, 58 pages. Illustrated with 8 half-tone plates and 8 line cuts.

LECTURES.

The demand for lectures before schools and granges far exceeds the supply. The demand has been met as far as time allowed, but the work that one man can do as State Ornithologist with the limited time at his command for this purpose is hardly a drop in the bucket compared with what should be done in the schools of the Commonwealth alone. In addition to lectures given by the State Ornithologist, the following speakers have given similar service during the year, but all are engaged in other activities and can give comparatively little time to this work: —

A List of Massachusetts Speakers on Birds and Bird Protection.

- Charles Crawford Gorst, 2 Arnold Circle, Cambridge, Massachusetts. Bird Music, Bird Habits and Bird Protection. Illustrated by colored charts and imitations of bird songs.
- Winthrop Packard, Canton, Massachusetts, Secretary, Massachusetts Audubon Society. Bird Music and Bird Welfare. Illustrated by lantern slides.
- Raymond J. Gregory, Princeton, Massachusetts, Chairman, State Grange Committee on Wild Birds.
- Mrs. E. O. Marshall, New Salem, Massachusetts, Secretary, State Grange Committee on Wild Birds. Many Phases of Bird Protection and Bird Life.
- Dr. Eleanor Mellen (Mrs. George H. Mellen), 291 Lake Avenue, Newton Highlands, Massachusetts, member of the State Grange Bird Committee. Economic Value of Birds; Attracting Birds about the Home; How to Study Birds; Author of "Practical Methods of Attracting Wild Birds."

Dr. John B. May, Cohasset, Massachusetts. Our Neighbors the Birds; Life and Habits of Birds; Methods of Attracting and Protecting Birds. Illustrated with colored bird portraits or lantern slides.

Walt F. McMahon, Secretary, Massachusetts Fish and Game Protective Association, Room 748, Tremont Building, Boston, Massachusetts. Intimate Views of Birds; Studying and Photographing Birds. Illustrated by lantern slides.

Walter K. Putney, Superintendent of Schools, Ashland, Massachusetts. Birds and their Value to all Mankind; Bird Lore and Curious Old-time Beliefs. Illustrated by lantern slides.

Mrs. Henry F. Whitcomb, Amherst, Massachusetts. Garden Planning and Planting to attract Wild Birds, etc.; Birds' Migrations; Economic and Artistic Value of Birds, etc. Illustrated by stuffed birds, skins, many colored plates and maps.

Horace Taylor, 294 Walnut Street, Brookline, Massachusetts. Life and Song of Native Birds; Evolution of Bird Life, etc. Illustrated by lantern slides.

Prof. Dallas Lore Sharp, Hingham, Mass. The Wild Life of Three-Arch Rocks. Illustrated by lantern slides.

LEGISLATION OF THE YEAR.

The most important legislation of the year was not State but national, affecting the birds of Massachusetts as well as those of all other States in the Union, and those of Alaska and Canada. The Federal law for the protection of migratory birds was the outcome of two bills, one presented in the House of Representatives by Hon. John W. Weeks of Massachusetts, and the other filed in the Senate by Hon. George P. McLean of Connecticut. These two bills were practically identical, and their provisions were enacted into law by Congress in 1913 as recorded in the annual report of the State Ornithologist for that year. This was the first legislation of this nature that had been enacted in the United States, and like all new and untried laws its provisions must be perfected in the light of experience gained in enforcing them. But the enemies of the law are determined that the Federal authorities shall have no such experience. These enemies are found east and west, north and south, wherever men want unrestricted opportunity to *shoot migratory birds all the time that they are there*. Such men are perfectly willing that protection should be given these birds while they are elsewhere. The strongest organization opposing the Federal law was the Interstate Sportsman's Association, composed largely of gunners

residing in Missouri, Kansas, Nebraska, Iowa and Illinois. This organization is said to contain about 2,500 members, and they sought to destroy the Federal migratory bird law, and even the Biological Survey which makes the regulations under the law, unless they could secure a special spring shooting privilege to their section. As noted in my report for 1915 attempts were made in that year to repeal the law; also the law was contested in the courts and carried up to the Supreme Court of the United States, where the case has been heard once, left undecided, scheduled for a rehearing, and finally indefinitely postponed. In the meantime, attempts have been made to defeat appropriations for the administration of the law, but these attempts have failed.

In 1915 some changes were made in the personnel of the committee having charge of the Federal regulations under the migratory bird law. Just at that juncture the Interstate Sportsman's Association, through its legislative agents and congressmen at Washington, was able to bring such pressure to bear on the Department of Agriculture as to secure a promise of an extension of the shooting seasons to March 10 in Illinois, Iowa, Nebraska, Kansas and Missouri, provided the gunners of those States would accept this as a compromise and cease their opposition. Already one month's extension had been granted to Missouri, and, grown confident by the apparent success of their efforts, the Interstate Sportsman's Association, or rather, perhaps, the extremists in that organization, refused to be satisfied with anything less than an extension of the shooting season to the 1st of April, and continued their campaign, directing their efforts first against an appropriation for the enforcement of the law and next against the proposed treaty with Great Britain, which was intended to strengthen the law and carry out its provisions in Canada as well as in the United States.

Soon after the proposed change in the regulations was published by the Biological Survey, great opposition to the extension of spring shooting developed, not only in the east where such opposition was to be expected, but in the west where apparently the malcontents had been having their own way thus far. It was shown that if such a privilege were granted, under pressure, to the gunners of a few States similar pressure would be brought to bear demanding similar privileges in many other

PLATE I.



EGG CLUSTERS OF THE GYPSY MOTH ATTACKED BY CHICKADEES.
The holes in the upper ends of the egg clusters show where the work of the birds has begun.



GYPSY MOTH EGG CLUSTERS DESTROYED BY CHICKADEES.
In this case all the eggs have been eaten from the egg clusters, and nothing is left but a little of the yellow down of which the cluster is partly composed. (See page 116.)
(Original photographs taken on the estate of John C. Lee, Wellesley.)

States. Dr. Wm. T. Hornaday of New York made an investigation of the western "insurrection" and published a trenchant *exposé* of the organization and methods of the malcontents which did much to prejudice their cause. It appears from this document entitled "The Missouri Campaign before Congress to destroy the Federal Migratory Bird Law," and from correspondence, that the opposition to the law was fostered largely by those who have shooting privileges or clubs at shallow lakes, which sometimes dry up in summer and autumn so that the ducks do not go there. The efforts of these clubmen were seconded by a large liquor dealer who sells to certain shooting clubs and controls certain liquor privileges which are patronized by many shooters. Publicity was given the movement by a newspaper man who had failed to secure an appointment under the Biological Survey, and who has been attacking the survey since.

The organization petitioned Congress to appropriate no more money for the enforcement of the migratory bird law, and asked Representatives and Senators also to vote against the treaty with Great Britain, which contained the provisions of that statute and which if passed would become the law of the land throughout the United States and Canada and would presumably settle all questions regarding constitutionality. Through its newspaper connections members of the association were able largely to influence or control newspaper comment over a wide area, and so to shape public sentiment that the movement seemed formidable. They secured the signatures of about fifty Congressmen to their petitions.

The Massachusetts Audubon Society took the lead in putting the matter before the Audubon societies of the country and in rousing sportsmen to combat the Missouri movement. Dr. George W. Field, president of the National Association of Conservation Commissioners, made several trips to the west and south and also to Washington in the interest of the appropriation and the treaty.

The National Game Protection and Propagation Society brought its resources to bear. Finally an appropriation of \$50,000 was granted by Congress for the enforcement of the Federal law, and the close of the open season in Missouri, Kansas, Nebraska, Iowa and Illinois was set back to January 1.

In the meantime, the treaty moved slowly, but it came back from Canada, having been ratified there, was signed by Robert Lansing, Secretary of State at Washington, and by Sir Cecil Spring-Rice, British Ambassador, on August 16. It went on the 17th to President Wilson who signed it and sent it to the Senate with a note of approval. It went to the Senate committee on foreign relations August 24. The committee transmitted it to the Senate August 25 where it was finally ratified August 29. This expeditious action on a State paper in the face of a vigorous and bitter opposition was not secured without effort. Senators Lodge and Weeks of Massachusetts were active in promoting the treaty, but much of the credit for its ratification so near the closing of the session is due to Senator Geo. P. McLean of Connecticut, whose industry and tact were constantly exerted for its passage. It has received the signature of King George of England and is now an accomplished fact. An enabling act by Congress and adequate appropriations will be required to secure its enforcement in this country. Thus, so far as the treaty is concerned, the work is only begun, but it is a good beginning.

AN ATTEMPT TO NULLIFY THE PLUMAGE LAW.

In December, 1915, a specious attempt was made to nullify the present Federal regulation prohibiting the importation of wild birds' plumage into the United States. The Paris Chamber of Commerce, instigated by the millinery trade of the French capital, addressed to the Secretary of State at Washington, through the French Embassy, a letter pointing out that the war found the French manufacturers in possession of large stocks of feathers, and requesting that a temporary tolerance permitting all kinds of manufactured feathers to enter the United States during the war be granted as a relief to the feather manufacturers of Paris who could no longer sell feathers in Europe. This, it was asserted, would provide employment for a large number of women in Paris.

This communication reached the Department of State and was said to have been referred to the committee on commerce of the Senate and the committee on interstate and foreign commerce of the House of Representatives. If it ever reached

the Senate it never escaped from the committee, and the women of Paris found other employment. Meanwhile, however, the smuggling of plumage into the United States began and still continues. At least, one large consignment was seized on the Mexican border and others are said to have come in by way of Cuba and Florida. Those who will persist in wearing these feathers should know that they are helping to depopulate the earth of bird life, and that in many cases the laws of at least two countries have been broken to serve them.

BIRD DAYS AND NIGHTS IN THE GRANGE.

State bird day exercises were held at Lunenburg May 20 and at Sandwich May 27. These meetings were arranged and conducted by the committee on wild birds appointed by the Master of the State Grange, Patrons of Husbandry, in conjunction with the Massachusetts Audubon Society and the Massachusetts State Board of Agriculture. The work of arrangement was done largely by Mrs. E. O. Marshall, secretary of the committee, and officers of the local granges in these towns. These meetings were largely attended. The forenoon was given up mainly to children, and many stayed for the afternoon meetings. The subjoined program of the Lunenburg meeting indicates its scope. Mr. Clayton E. Stone, a member of the State Grange bird committee and of the Lunenburg Grange, attended to the details which insured success.

MASSACHUSETTS STATE BOARD OF AGRICULTURE.

STATE BIRD DAY.

THE MASSACHUSETTS STATE GRANGE AND THE MASSACHUSETTS AUDUBON SOCIETY CO-OPERATING WITH THE STATE BOARD OF AGRICULTURE AND LUNENBURG GRANGE AT LUNENBURG, SATURDAY, MAY 20, 1916.
Presiding Officer, Raymond J. Gregory, Chairman, State Grange Committee on Protection of Wild Birds.

Program.

10.00 A.M. At Town Hall: —

Inspection of Audubon exhibit. Exhibit of young people's prize nest boxes and bird houses, and prize colored drawings.

Exhibit of the Clayton E. Stone collection of 200 Massachusetts birds, mounted.

10.45 A.M. At Town Hall: —

Young people's meeting. Free stereopticon pictures by Walt F. McMahon, Secretary of the Massachusetts Fish and Game Protective Association, and Walter K. Putney of Ashland Grange.

12.00 M. Award of prizes.

12.30 P.M. Basket lunch: —

Coffee and sandwiches free, given by Lunenburg Grange.

1.30 P.M. On the Common: —

Welcome by J. P. Gilchrist, Master of Lunenburg Grange.

At Town Hall: —

Children and Birds, by Edward E. Chapman, Master of the State Grange.

Value of Birds to Farmers, by Wilfrid Wheeler, Secretary of the State Board of Agriculture.

Value of Birds in Forests, by Edward Howe Forbush, State Ornithologist.

Experience in attracting Birds by Nest Boxes, Bird Feeding and Control of Enemies, by William P. Wharton of Groton.

Bird Music and Bird Welfare, by Winthrop Packard, Secretary of the Massachusetts Audubon Society.

Bird Walks, if Practicable.

Children's bird days were held under the supervision of the lecturer of the State Grange, Mrs. George S. Ladd, at Grafton May 13 and at Ashland June 10. These were very successful meetings and were enjoyed by the children. At the Grafton bird day a large number of nesting boxes and bird houses, made by the children, were put up in the forenoon by the youngsters, who were taken by citizens who furnished automobiles to the places where the nesting boxes were to be erected. The phenomenal success of this meeting and the great attendance were due largely to the excellent executive work of Mrs. F. J. Goff, lecturer of the Grafton Grange. The program of this meeting is given for the benefit of those in other towns and granges who may desire to arrange such exercises.

GRAFTON CHILDREN'S ANNUAL BIRD DAY.

UNDER AUSPICES OF GRAFTON GRANGE, CHURCHES AND ALL ORGANIZATIONS OF THE TOWN, SATURDAY, MAY 13, 1916.

12.30. Parade by school children accompanied by Lyman School Boys' Band. Marshaled by Camp Fire Girls and Boy Scouts.

1.00. Lunch for children.

- 1 15. Band concert on Common.
1.30. Judging of bird houses and collections of woods on Common.
1.45. Town Hall:—

Welcome by John B. Knowlton, Master, Grafton Grange.
Music by school children, under direction of Miss Flora Randall.
Solo, Mrs. Elizabeth E. Rutter, Grafton.
Stereopticon lecture, 60 slides on Birds and Bird Houses, by
Walt F. McMahon, Secretary, Fish and Game Association,
Boston.

Addresses by Raymond J. Gregory, Chairman of State Grange
Bird Committee; Edward Howe Forbush, State Ornithol-
ogist; Winthrop Packard, Secretary, Audubon Society; Miss
Margaret Brigham, Grafton; Mrs. Geo. S. Ladd, Sturbridge;
Mr. Walter Putney, Ashland. Charles Crawford Gorst,
Musical Genius of Birds.

Other organizations in other towns selected and celebrated bird days. Many subordinate or local granges celebrated bird nights during the year. The following circular prepared by the secretary of the bird committee of the State Grange, and published by the lecturer of that body, will give some idea of how these activities were directed:—

SUGGESTIONS FOR BIRD NIGHTS (APRIL OR MAY SUGGESTED).

Birds are most in evidence in May, when it is courting time and singing time for most, and in June, when the greatest numbers are nesting.

But bird nights are useful at any season. Data and questions may be kept for spare moments, or when programs need something more.

Decorations.—Two-cent Perry pictures are large (7 by 9) and beautifully colored. In Sturbridge Grange a large collection of these was laid against the wall, and a young man, a bird student, showed the appropriate picture as he spoke of the birds he had observed and read of.

The 1-cent Reed pictures are comparatively accurate and all of native birds, 80 of them, thus being better for contests.

Audubon colored pictures, accompanied by attractive leaflets and outline drawings, are unexcelled for beauty, but cannot be seen at a distance as well as Perry pictures.

Lists of Species seen.—Yearly lists ought to begin on January 1, but if not, can be recalled and recorded. Lists may be read on bird night. Daily lists may be read and discussed. (One member beat the record with 57 species on May 27, 1914.) Reed's "Land Birds and Water Birds" are best for beginners. Fuller descriptions are in Chapman's and Hoffman's books.

Essays.—Any bird, as the bluebird, the barn swallow, the downy woodpecker, the ruffed grouse, makes a good subject. An ideal paper truthfully records one's own observations, verified and enriched by reading.

Observe, confer with and read reliable authors, then write. Other subjects: Our permanent residents; the thrush family; the sparrow family; our water birds; our game birds and how to conserve them; value of birds to trees; the relations of birds, trees and insects. Which are doing most to hold injurious insects in check, birds or men?

References. — The Audubon Society, 66 Newbury Street, Boston, has leaflets about any bird you want. For interesting facts, especially economic, the State bird books "Useful Birds and their Protection" and "Game Birds, Shore Birds and Wild Fowl" are in every public library in the State and sold at cost, \$1, by the Board of Agriculture, State House, Boston. E. H. Forbush is the author of both.

Readings. — More people will be interested in truthful publications like the above than in fancies and guesswork. Dramatic readings might be arranged from Percy MacKay's "Bird Masque." This was played before President Wilson.

Stories. — Hunting with bird glass or camera, feeding birds, or watching birds' nests, etc., make stories which many students are eager to tell.

Discussions. — Subjects: Could a bird club, organized by grange officers, be made a "community service" in this town? Could we make a bird sanctuary in this town? (See bird club number of "Bird-Lore," September-October, 1915.) Could we combine to keep large areas posted, co-operating with the State Fish and Game Commission? Can we hold in check rats and mice, and lessen the kind of cats that hunt birds? (Reference: "Rats and Rat Riddance.")

Bird Laws, State and National. — A lawyer should lead in this, or write to the Fish and Game Commission, State House, Boston, and the Biological Survey, Washington, D. C.

Music. — Reading and piano representations of bird music from Matthews' "Field Book of Wild Birds and their Music."

Contests. — 1. Some 30 or more of the most common of Reed's miniature bird pictures are tacked around the hall with names covered. Those who make the best lists of these are given prizes.

2. Each member wears something to represent a bird. The best representation may receive a prize. But this is more certain to succeed if names of birds are "jumbled," that is, letters misplaced and pinned to each member. Then members go around examining, and those who get best lists get prizes. This is very lively and social.

Prizes. — Prizes may be offered at the beginning of the year or on bird nights, and awarded on bird nights, grange fair nights or at close of year.

For best essays by members.

For best essays by school children.

For most practical winter feeding device.

For most practical summer watering device.

For most practical nest box or house.

Greatest number of occupied bird houses reported.

Best success in attracting birds.

Best yearly list of species seen or heard.

Best daily list of species seen or heard.

Best imitations of bird notes.

Prizes may be as follows:—

An Audubon picture and leaflet, 2 cents.

Portfolio of bird pictures, 50 cents.

Reed's "Land Birds," 75 cents.

Reed's "Water Birds," \$1.

Useful Birds and their Protection, \$1.

Wire suet holder, 15 cents.

Or crocheted suet holder, which is given away by the secretary of the bird committee at New Salem, who is ready to aid in any way. The chairman at Princeton is also always glad to help.

RECOMMENDATIONS FOR LEGISLATION.

The State Grange effort in bird study is exerted partly to interest the children; also the National Association of Audubon Societies, acting with the Massachusetts Audubon Society, has enrolled 23,760 Massachusetts school children in classes for the study of birds. There is much sporadic and often ill-directed effort toward bird study and bird-house building among the children in the public schools. The demand for definite instruction is growing. It must be met and the energies of the young properly guided, otherwise harm as well as good may result. Such instruction as is given should be standardized, and the work should at least be started in the right direction.

BIRD STUDY IN THE SCHOOLS.

Every year the State Ornithologist is called upon by teachers in rural schools for information or literature that will enable them to teach the children about birds or to answer questions asked of them by the children. The country school is situated where the birds are, and many of the pupils are at the very age when eagerness for knowledge regarding birds and other living animals may be best developed; but in these country schools which have such excellent facilities for bird study at their very doors this study, as a rule, is most neglected. Some city schools have teachers or supervisors of natural science or nature study. Most country schools have none, and many teachers know so little about birds that they cannot instruct the children. Others who have some knowledge of birds do not know how to interest the children, or consider that it is not their business to interest them in ornithology.

The study of birds has a remarkable educational value and should be advocated not for the sake of the birds alone but for the good of the children. It gives to many of them a new outlook, a new interest in life, and develops their observational faculties in a natural way. The first task is to arouse the child's interest. Colored plates will do this. Any teacher or older pupil could readily learn to know most of the more common birds by using a field manual illustrated by colored plates, such as may be procured now at small cost, but the child should be brought into contact with the birds themselves.

If we are to have bird study at all in our rural schools it must be taught in such a way that both parents and school committees can see that it has some elements of utility. The purposes of bird study in the schools are set forth briefly by Gilbert H. Trafton, an educator of experience in this branch, in the following words: —

The chief purposes of bird study in the schools may be briefly stated as follows: first, to give the children greater pleasure in living, through an acquaintance with the birds; second, to teach them the economic value of birds; third, to teach them to protect and aid the birds.¹

Bird study in the public schools need go no further than this. This has a practical and rational side. It needs no excuse for its introduction. It need not interfere to any extent with the regular curriculum. The interest awakened in birds among pupils of the lower grades undoubtedly would turn a few of them to ornithology or kindred sciences, but these pupils would pursue the study further. They would get their scientific training in the higher institutions of learning or continue the work as an avocation, which would add to the richness and fullness of their maturer years and enable them to pass on some of their interest and knowledge to their children's children.

It is admitted now generally that a benevolent humane interest in birds is desirable in the young, but little is done by the Commonwealth to stimulate that interest. As noted in my last annual report, a committee of school superintendents acting under a suggestion from the State Board of Education has drawn up and published a plan of a course on physiology, hygiene, nature study, plays and games for rural schools, which

¹ "Bird Friends," Houghton, Mifflin & Co., 1916, page 279.

PLATE II.



"KITZ KORNERZ."

"Buff," regardant but harmless. Cage or corral for cats. This saves the birds. Shows roof, leaping shelves and boxes. This cage is 24 feet long, 12 wide and 8 high. Base-board extends 1 foot into ground. Cage covered with 1-inch mesh chicken wire. (Photograph by courtesy of Dr. Emily G. Hunt, Pasadena, California. See page 121.)



"CATNIP COTTAGE."

"Nibbs" quiescent. Interior of cage, showing open end of subway, made of drain tile of 13-inch interior diameter, connecting with house cellar. Ground in cage planted with grass, catnip, etc. (Photograph by courtesy of Dr. Emily G. Hunt, Pasadena, California. See page 121.)

includes bird study, but the Commonwealth has done little, if anything, toward the actual establishment of bird study in rural public schools.¹ Such instruction as is given there is voluntary and sporadic on the part of teachers or philanthropic associations, and has no place in the school curriculum. The Commonwealth should do something annually to stimulate interest in bird life in the schools.

BIRD TALKS IN THE SCHOOLS.

The impossibility of supplying from this office the school demand for lectures on birds is shown by the experience of Henry Oldys of Silver Springs, Maryland. In March, 1915, he was engaged by the Massachusetts Audubon Society and the National Association of Audubon Societies to give free lectures in Massachusetts on the utility of birds, with imitations of bird songs. He took more than 100 engagements in a month and filled 90 of them. Most of his audiences consisted of school children or contained them.

Provision should be made for the employment by the Commonwealth of a first-class speaker, approved by the State Board of Education, to tour the public schools of the State annually and give talks to at least one grade in each town regarding the usefulness of birds and the means of protecting and attracting them. Nothing will so arouse the interest of children in school hours as good colored plates properly explained and correct imitations of the songs of birds. This will lead many of them to an interest in the living birds. The speaker would require but one hour from each pupil in one grade, or perhaps two grades, during each school year, and in that one hour a trained man could put a few facts so forcibly and clearly before the children that many would *never entirely forget them*.

BIRD DAY IN THE SCHOOLS.

Every public school teacher and pupil in this enlightened Commonwealth should be required by law to give up one school day in each year to the study of birds. We have already an

¹ Bulletin of the Massachusetts State Board of Education No. 8 contains a suggested course of study in practical science designed for certain rural schools. It was arranged by teachers in State normal schools, and contains suggestions regarding bird study, helping the birds and the value of birds.

arbor day which is observed more or less, and in some schools the birds and the trees together are the subjects of school exercises. Occasionally some organization gets out an arbor day manual with some reference to birds, but we should have one day devoted to birds, when children can learn about the birds and be taught to feed them, to put up bird houses and to plant shrubs and trees that furnish food for birds. There should be a bird day manual printed annually at public expense, illustrated by one colored plate at least and giving suggestions for the observance of bird day. This manual should be distributed free of charge to all public school teachers in the State. Most of the States have had already some form of bird day exercises, and Florida, South Dakota, Utah, Kansas, Illinois, Washington, Virginia, Colorado, Oklahoma, New Mexico, Pennsylvania and Alaska officially celebrated a definite bird day this year. Why does Massachusetts lag behind in this movement?

A REPORT ON THE BIRDS OF MASSACHUSETTS.

In answering questions about birds from people in all parts of the Commonwealth during the past twenty years I have learned something about what the people of Massachusetts desire to know about birds, and it is time to begin to get together a report that will furnish such knowledge. Already two volumes have been published by this Board on the birds of the Commonwealth, but they have included only part of its bird life and have been devoted mainly to recording the destruction of birds by man, their utility and the means for their protection. It is purposed now, if the Legislature will provide the means, to publish a report on all the birds of Massachusetts, dealing with the distribution of each species in our territory, and giving in concise form such information as will be most valuable to include in such a work. Each species should be fully described and figured in colors. Next to the bird itself the colored plate is the most important means of interesting the student and determining the identity of the bird. Both male and female should be figured, and where the seasonal plumages differ greatly other figures would be needed. This would be a work of at least four years, as it would be hardly possible to have the drawings completed in less than three years.

AN ASSISTANT TO THE ORNITHOLOGIST.

Considering that the present incumbent of the office of State Ornithologist is already fully occupied, it may be asked how such a work as is proposed can be produced. As the labor of the office increases annually, an assistant should be provided in any case. This would give the ornithologist time for the study and travel necessary to complete the work on the birds of the State, and eventually would provide a trained man to fill the vacancy in the office that must occur sooner or later.

THE STARLING.

The introduced starling is now common in many towns in the State and numerous in some areas. Many complaints have been received regarding its destructiveness to fruit and to native birds. It is a useful bird, but wherever it has been introduced into a new country and become established it has sooner or later increased so in numbers as to be more or less injurious. Even in England, where it is native, its numbers now are so great that it is destructive to certain crops. In Massachusetts it is still protected by law with other insectivorous birds. It is time to remove such protection from it, as has been done in New York, Connecticut and Vermont. The friends of the starling need not fear its extermination or any serious depletion of its numbers. It is now well established, is as crafty as the crow, much more prolific and will be protected by its many friends. The English sparrow is not only proscribed by law, but municipal authorities are required by law to destroy it — yet it is still with us. The starling is much better able to take care of itself than is the sparrow. If legal protection be removed from the starling an opportunity will be offered for farmers to protect their fruit and grain from its ravages, and, for those who prefer other birds, to prevent it from driving out native species or destroying the eggs or young. If the starling is to be kept on the protected list, then the jay, the crow and the crow blackbird should be protected, as they are in some ways more desirable than the starling. There are many objections to the introduction of birds from foreign countries that

do not apply to native birds. The United States government now wisely prohibits the importation of foreign birds for liberation here.

THE NESTING-BOX CAMPAIGN.

The campaign to induce Massachusetts manufacturers to make and sell inexpensive nesting boxes and bird houses and to influence people to make them and put them up goes briskly on. Hundreds if not thousands of nesting boxes and bird houses have been made and erected by school children. In some cases this work has been encouraged by teachers. Most manufacturers soon tire of the business of making nesting boxes as it is not profitable, but Winthrop Packard of Canton sells about 10,000 paroid boxes a year, and several other Massachusetts manufacturers dispose of a lesser number of wooden boxes annually. Now comes John C. Lee of Wellesley, a public-spirited citizen, if ever there was one, who induces manufacturers to make nesting boxes and feeding appliances by the thousand at the lowest possible rates, and then turns them over to the public at cost; also he furnishes plans, patterns and specifications so that any one can make these boxes. Mr. Lee has become convinced by his experience in attracting birds on his own estate that they render efficient assistance in destroying insect pests, and he is doing missionary work to spread the idea of bird protection. He has observed chickadees eating the eggs of the gypsy moth upon his trees. Plate I. shows some egg clusters of this moth when first attacked by chickadees, and others where the birds have destroyed all the eggs, leaving only a thin coating of the yellow covering hairs attached to the bark. This is not a new discovery, as I have already reported the chickadee, the downy woodpecker and nuthatches as feeding on these eggs,¹ and about 50 species of birds are known to destroy other forms of this moth; but the experience of Mr. Lee indicates that the habit of eating these eggs is spreading among the birds, as it had not been noticed previously in the region about Wellesley.

Mr. Lee has experimented with nesting boxes similar to some advocated in my previous reports, and has improved upon

¹ Annual reports of the State Ornithologist for 1910 and 1911.

PLATE III.



WELLESLEY BIRD BOX.

This is both inexpensive and effective. Note entrance guard of galvanized iron. (Photograph by John C. Lee. See page 117.)



WELLESLEY BIRD BOX WITH TOP OFF. (Photograph by John C. Lee.)

them in some respects. His method of fastening the top so that it may be quickly removed is simple and inexpensive, and his plan of covering the wooden top with roofing paper so that the paper overhangs in front and at the sides is an excellent one to keep the contents dry.

He has not only perfected an inexpensive wooden box but has arranged to secure large numbers of small nesting boxes, made of heavy two-ply roofing paper, that may be packed flat and sold at \$5 per hundred. They may be put together by the buyer, as all are punched ready for the fasteners. Each of Mr. Lee's nesting boxes is provided with a galvanized-iron plate surrounding the entrance hole, — a very necessary adjunct in a land of squirrels and woodpeckers. The roofing paper boxes are yet untried, but somewhat similar domiciles have been used by the birds. Probably, however, they should be put up where they will be in the shade during the hotter part of the day. The wooden boxes have been very successful. Mr. Lee is not a dealer in nesting boxes, but will supply at cost those who can use 100 or more, and is glad to furnish patterns to those who will make the boxes for their own use; therefore his plans are published herewith.

Mr. E. C. Ware of Wareham has invented a nesting-box trap for the English sparrow which is somewhat similar in design to that presented at the Annual Congress of the American Ornithologists' Union at Philadelphia in November by Ernest Thompson Seton. Mr. Seton invented his box years ago, while Mr. Ware, working along the same lines, perfected his early in 1915. Mr. Seton asserts that the chief advantage of the box is not that sparrows are caught, but that the others become suspicious of the box, and after one or two have been trapped in it no English sparrow will enter, while native birds will continue to nest in it. The trap will not spring on the entrance of the bird, but is sprung by the owner, who by day or night pulls a string when the bird is inside. This closes the entrance with a shutter and thus imprisons the bird, after which it may be taken out by opening the top.

EXPERIMENTS WITH NESTING BOXES.

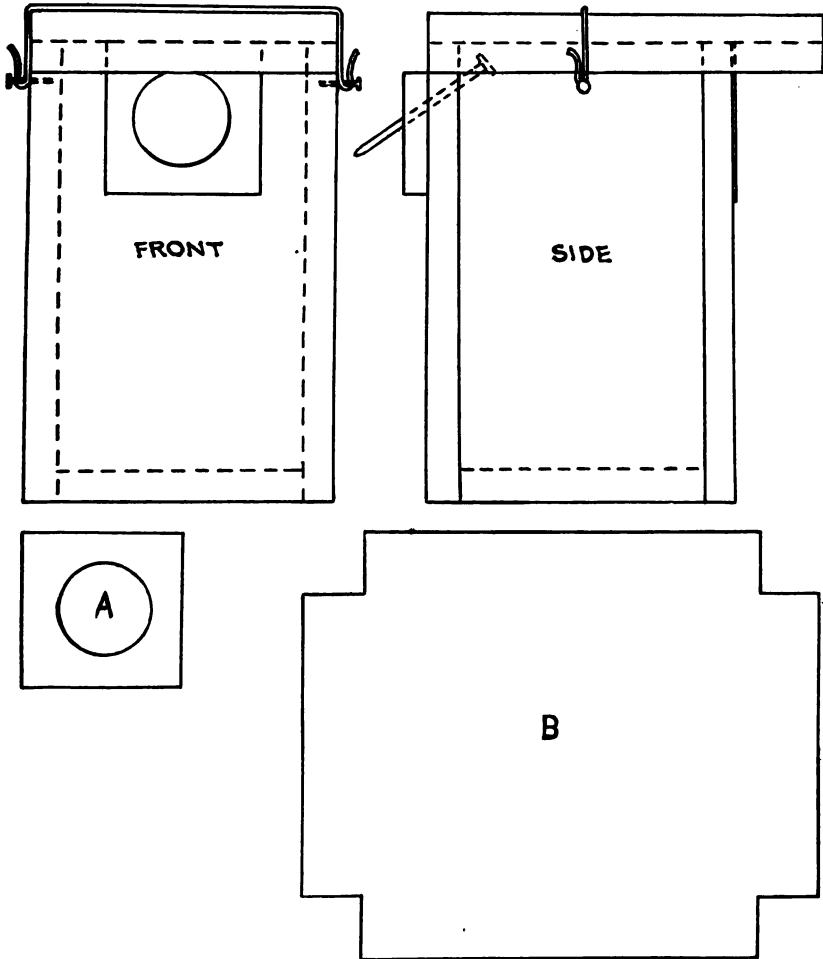
Experiments with nesting boxes were continued at Wareham during the year. The erection of numerous boxes in the woods was discontinued, but a few were put up there for chickadees and flickers, and two were set up on the edges of the woods for bluebirds or swallows.

Several small boxes for chickadees were placed in second-growth woodland and in thickets near the ground. These, evidently, were popular, not only with the chickadees but also with deer mice, bumblebees, hornets, wasps and gypsy moths. They were too accessible to cats, also, and only one brood of chickadees was reared in them. Boxes for chickadees are safer if raised 15 to 20 feet above the ground.

The number of nesting boxes in the open at the Wareham station was increased largely in 1916 over those of 1915 by the addition of many boxes taken from the woods, but, owing to unusual mortality among both old and young birds, fewer young were reared in 1916 than in 1915. This appeared to be due chiefly to severe, unseasonable storms in June. In past years birds have had excellent success in rearing their young in boxes facing to the south or southwest. Such southerly rain storms as occurred in those years were brief and warm, but in 1916 several long and severe storms came with southerly winds, and, as a result, many young tree swallows and two adults were found dead in the boxes. One family each of flickers and bluebirds were destroyed also. The southerly gale blew so hard and long that much rain drove into all the entrance holes and even through cracks and joints. This is unusual, and has not occurred before in our experience at this season, but we will now try facing the entrance to the northwest, as in our experience in this region no long storm was ever known to come from that direction. If the nesting boxes are not watched closely in such cases and the dead birds removed, the living ones are likely to desert both the boxes and the neighborhood, and apparently some such desertions occurred in this case, as the number of birds about the boxes was much greater in early spring than last year, but fewer pairs bred.

Again this year a pair of chickadees built their nest in a box

PLATE IV.



WELLESLEY BIRD BOX. (No Patents.)

Plans and Specifications. — Of $\frac{1}{2}$ -inch white pine, rough sawed; interior dimensions, 4 by 4 by 7.

A. *Entrance Guard of Thin Galvanized Iron.* — One and one-half inch opening for bluebirds and swallows, $1\frac{1}{4}$ inch for smaller birds. Dimensions of Stock: Top, 5 by $6\frac{1}{4}$ inches; front and back each 5 by $7\frac{1}{2}$ inches; sides, 4 by $7\frac{1}{2}$ inches; bottom, 4 by 4 inches. The box is put together with $1\frac{1}{4}$ -inch galvanized box nails. The roofing paper and entrance guard are fastened with $\frac{1}{2}$ -inch galvanized tacks.

B. *Two-Ply Roofing Paper for Top, 7 by $8\frac{1}{2}$ inches.* — Cut at the corners to turn down 1 inch on each side.

The top of the box is removable, but is held in position by a piece of galvanized No. 16 soft iron wire looped over a tack on each side.

Two holes about 1 inch apart are bored in the upper part of the box in a downward direction from the inside, so that when the cover is off, the box can be nailed to a post or tree with $2\frac{3}{4}$ -inch galvanized wire nails.

with an entrance but 1 inch in diameter. The female laid eggs but deserted them, and the nest was occupied by bumblebees. The $1\frac{1}{8}$ or $1\frac{1}{4}$ inch entrance is probably best for chickadees.

A WARNING AGAINST DEEP NESTING BOXES WITH SMOOTH INNER SURFACES.

The necessity of examining nesting boxes frequently was shown by our experience this year with three deep flicker boxes made of planed boards. On the first inspection two dead adult tree swallows were found in one, and, later, several were discovered in the others. The cause of their death was not understood at first, but daily examination of these boxes revealed the fact that if tree swallows entered them and went to the bottom they could not get out. Many thus trapped were liberated. A close watch of the boxes seemed to prove that these birds use their wings in climbing out of a deep cavity and escape by both fluttering and clinging. If the inner surface of the wood is smooth, neither wings nor feet find any hold, and the birds flutter and die in their attempts to escape. When the interior surface was roughened, or when a piece of fine wire screen was tacked on the inner front surface, the birds easily escaped. This showed the necessity of having all deep nesting boxes roughened or scored inside from bottom to entrance hole, to provide a ladder for the escape of old or young birds.

A SUCCESSFUL NESTING SITE FOR WRENS.

The reproduction from a photograph shown on Plate V. represents a cow's skull hung up in a tree as a nesting place for wrens. In the annual report of the State Ornithologist for 1914 the success attending the efforts of Dr. B. H. Warren in colonizing birds on Wallop's Island, Virginia, was reported. Since then the Liberty Bell Bird Club of Philadelphia has established a bird sanctuary on the island, and for want of more genteel nesting boxes they hung up for the wrens 24 empty cow skulls that were found bleaching there. Almost immediately 23 of these were occupied by wrens, so writes Mr. Charles P. Shoffner, secretary of the club. The wrens found these nesting places safe, as the occipital entrance to the brain cavity is so small

and the skulls so strong that most of the enemies of these birds cannot get at the eggs or the young. A wren has been known to use a human skull for the same purpose. Mr. Harold Bailey showed me how Carolina wrens built their nests in old tin cans thrown into the bushes that line the steep banks of the river at Newport News, Virginia. The house wren has been known to use old straw hats and felt hats hung up out of doors, or even the pocket of a coat hung up and forgotten.

NEW AND INEXPENSIVE FEEDING APPLIANCES.

Mr. Lee, whose nesting boxes have been referred to on a previous page, has also perfected inexpensive and successful feeding appliances to attract birds. Many people now believe that a number of small feeding places for birds are more useful than one large one, as the birds are less likely to quarrel over them. Mr. Lee has invented a substitute for the rather expensive German food bell. This consists merely of a bottle, a tube, a galvanized iron or zinc shield, and a small earthenware tray such as is used under small flower pots. Almost any one can make this arrangement with perhaps a little help from the tinman. (See Plate VI.)

The bottle is filled with bird seed or fine chick feed and placed in the hanger, then turned upside down and hung in a tree. This hanging device has been tested for parts of two seasons. The birds come to it readily and the seed is well protected from rain or snow. It comes down as the birds eat it from the tray, and if either bottle or tray is broken another may be secured in almost any town.

The large box shown on Plate VI. is used for feeding scraps from the table to birds in winter. All scraps and waste from kitchen and table may be utilized thus in winter by those who do not keep hens or pigs. The box is hung up in the trees to baffle dogs, cats and rats. At first, the cover is left off so that the birds may find the food, and those who desire to feed crows may leave the box uncovered most of the time. Crows do little harm in winter and much good. If it is desired to feed only smaller birds, and perhaps squirrels, the cover may be replaced after the birds have become accustomed to feed from the box, and there will be room enough at the sides for them to get in.

PLATE V.



COW SKULL OCCUPIED AS NESTING BOX BY WRENS.

Birds are not very particular about the size or shape of their nesting cavities. Twenty-four skulls were hung up on trees at Wallop's Island, Virginia, and 23 were occupied immediately by wrens. (From photograph by Charles P. Shoffner, Secretary, Liberty Bell Bird Club, Philadelphia. See page 119.)

TO PROTECT FEEDING STATIONS AND NESTING BOXES FROM CLIMBING ANIMALS.

Nesting boxes and feeding boxes mounted at least 7 feet from the ground, upon iron rods or pipes, are not much molested by climbing animals, although rats and probably squirrels can climb up a 1-inch galvanized iron rod or pipe. The device shown in the frontispiece is a sufficient safeguard against cats if made large and placed at least 6 feet from the ground, but a gray squirrel frequently has surmounted a similar device at our experimental station at Wareham, and I have known one to go up a tree trunk surrounded by a zinc band 3 feet wide. The perfect inexpensive squirrel protector has yet to be devised.

CONTROL OF THE CAT.

No publication that has appeared from this office has met with greater appreciation or a larger demand than the bulletin on the domestic cat as an enemy of birds. The first edition of 20,000 copies was exhausted almost at once. Offers to buy the bulletins in large quantities came from many States, but these orders could not be filled. No money was available for printing another edition. Later a second edition of 8,000 copies was published by subscription, and this is nearly exhausted. The bulletin was reviewed by many newspapers and magazines, and thus the immense destruction of birds by cats was brought before the public. This has resulted in unusual activity in the suppression of the vagrant or vagabond cat, and some communities have established a license or registration plan under which unregistered cats are destroyed humanely by officers appointed for the purpose. Many people in many parts of the United States are experimenting with different means of controlling or confining their own cats during the nesting season of birds. Some keep them in a chicken coop; others intern them under the piazza; still others use a collar and a leash attached to an overhead wire. Plate II. shows a successful arrangement utilized in California.

Since the European war began Germany has been unable to supply this country with the usual quota of cat skins for the fur market. This has resulted in a demand here for native cat

skins which have sold at prices varying from 20 cents to \$2, according to size, quality and color. There is hope for the future of the birds in the constantly increasing prices of fur. Eventually this will act as a bounty on the vagrant wandering cat.

FEW IF ANY BIRDS KILLED BY SPRAYING.

All dead birds sent in during the summer as victims of the work of spraying the trees with poisonous insecticides were examined, and in all cases where death was not evidently attributable to other causes they were analyzed for arsenic. In no case was any perceptible trace of the poison found. Thus far the evidence of poisoning by spraying is chiefly negative, as in nine years only three birds that possibly were poisoned by spraying have been found. Many tales are told of the great numbers of birds killed by the spray, but the birds so poisoned are not forthcoming. They do not reach this office. While it is quite probable that where large quantities of poison are used and trees are heavily sprayed some birds may be poisoned, and while it may be possible that they are sometimes fatally affected by drinking water contaminated with spray, or by drinking the spray itself, there is as yet no evidence that would convince a careful investigator that any great numbers of birds are killed by spraying.

On the other hand, many so-called wild rabbits or hares have been picked up dead where spraying has been done, and, although the stomachs of these rabbits have not been analyzed, it seems probable that they were killed by spraying, as they live mainly on vegetable matter, while in spring and early summer when spraying is done the birds live chiefly on insects and will not touch those that appear sickly or are dying from the effects of the insecticide.

THE HEATH HEN.

Three days were spent on Martha's Vineyard in April in an attempt to determine by personal observation whether the efforts to prevent the extinction of this bird give any real promise of success. I am convinced from personal observation that there were then at least ten times as many heath hens upon that island as were there when the Massachusetts Board

PLATE VI.



WELLESLEY FOOD BELL.

An inexpensive and effective appliance for feeding birds. (Photograph by John C. Lee. See page 120.)



WELLESLEY RECEPTACLE FOR FEEDING BIRDS ON TABLE SCRAPS.

These appliances were invented by John C. Lee of Wellesley. (Photograph by Mr. Lee. See page 120.)

of Commissioners on Fisheries and Game first undertook to save them from complete extinction. After a rather careful survey of the island I felt sure that some 800 birds had been accounted for. Others believed that there were as many as 2,000, but in any case the experiment seemed quite certain of success. Since then, however, a severe fire has swept the breeding grounds, and it is now believed that the number of birds has been much reduced.

THE PURPLE MARTIN.

Despite the unseasonable storms of the past few years martins have increased in some localities. Mr. J. A. Farley has secured a statement from E. W. Padelford of Kingston who asserts that the species has been slowly increasing there since 1907. Mr. Farley says that in 1915 martins were nesting at two localities in Carver and one in Westport. They have also settled again at Middleborough and at Rock Station, and have been reported near Springfield and at Gardner.

The martins seen in Wareham in 1915 did not appear in 1916, and apparently most of the young birds which were hatched in Massachusetts in 1916 must have been destroyed by the storms of June. Martins nest, however, as far north as Toronto, Canada, and J. H. Fleming writes that he has observed there the same habit of taking green leaves for their nests that Dr. B. H. Warren has noticed in Pennsylvania. Mr. Fleming believes that the leaf cutting usually is done in hot weather when the young are unfledged, and suggests that it may be a device to cool the nest as well as to line it.

THE EVENING GROSBEAK.

In the winter of 1915-16 this species was reported in small flocks from parts of Essex, Middlesex, Worcester, Hampden and Berkshire counties, and from so many localities that it seems probable that the flight covered most of the State, particularly as the species was reported also from Maine, New Hampshire and Connecticut. This seems to be the greatest New England winter migration of this species on record, and may indicate that the bird, once almost unknown here, is about to extend its range permanently to this region.

AN ABUNDANCE OF BIRDS.

An unusual abundance of small birds was noted during the spring and summer in many parts of the State and in other States. This has been credited largely to the effect of the Federal law for the protection of migratory species, but other factors probably were responsible in part.

If the time ever comes when the bird laws and regulations are properly adjusted and reasonably enforced, nothing more can be done in that direction. The greatest possibilities of increasing the numbers of useful birds lie in the direction of so educating the individual that each landowner will do his part in protecting and fostering such birds on his own property.

Respectfully submitted,

EDWARD HOWE FORBUSH,

State Ornithologist.

SEVENTH ANNUAL REPORT
OF THE
STATE INSPECTOR OF APIARIES.

PRESENTED TO THE BOARD AND ACCEPTED,
DECEMBER 5, 1916.

SEVENTH ANNUAL REPORT OF THE STATE INSPECTOR OF APIARIES.

To the Honorable State Board of Agriculture.

The demands for the services of the apiary inspector and his deputies have been as great or greater than in previous years. Unfortunately, service must be proportioned to an insufficient appropriation, as this Board I believe well realizes. Yet an analysis of the work done is favorable in proportion to the funds used. The question arises, however, would it not be good policy for the State to provide for more extensive, State-wide assistance to the beekeepers?

There are two ways of furnishing inspection service, as practiced in different States of the country. One is to hit merely the high spots, that is, to visit the larger apiaries, assuming that the lesser apiaries need no inspection service. This policy, for Massachusetts at least, is fundamentally wrong, as often the large apiarist is quite as able to cope with infectious bee diseases as the small apiarist. It is argued, however, that the large apiary is of more economic importance than the small. This may not be entirely true, as the apiary of a few colonies may become in time a commercial yard of greater economic importance. In the inspection work of Massachusetts a more conservative policy has been adhered to, namely, systematic inspection over given areas, governed by the intensity of the infection and the success with which the beekeepers are meeting it. However, this policy, which was early agreed to, is somewhat more costly than if the inspectors were to visit exclusively large apiaries. Nevertheless, the policy has in a great measure met the demands for Massachusetts, and at the same time overcomes the frequent objection elsewhere to "skipping apiaries." The large beekeeper and the small beekeeper, the

long-experienced and the beginner or novice, always have equal access to the best energies of the service proportionate to available funds.

The figures for the work for the year show that upwards of a hundred more apiaries were visited in 1916 (1,622) than in the year previous, and that the number of colonies examined (4,121) exceeded that of the previous year. Moreover, 132 of these apiaries were visited two or more times, and some even four, five or six times. This amount of work was done in spite of the excessively rainy season during the early part of the inspection period, when the best efforts of the inspectors were foiled. It is in the early season, too, that inspection is particularly important and urgent.

As an example of the thoroughness with which the inspection work is carried on, and showing that all apiaries, large and small, are visited, it has been calculated that the average number of colonies maintained in the apiaries inspected in 1916 is three and a fraction. Doubtless had inspection been in territory free from disease, the average number of colonies in an apiary would be much greater. It is encouraging, too, to find there are marked reductions this year in the percentages of infected colonies, as is mentioned below.

Early in the season, the year 1916 promised to be phenomenal in clover honey production. The remark was common, "I never saw so much white clover." To the beekeepers' great disappointment it rained and rained. While the bees did their best, and in some instances much better than might have been expected under the circumstances, it is difficult to estimate what the clover honey crop would have been with favorable weather. This was the first year in five or six that clover growth approached a high standard in Massachusetts.

The year, however, was not without its important results; the State apiary produced a grade of clover honey which excelled in color, flavor and body similar honey sampled by the writer over a wide range of the eastern United States. A comparative display was made at the Eastern States Exposition in October. It demonstrated that Massachusetts beekeepers can with care and skill secure clover honey equal to any offered by eastern producers thus far known.

Each year the records would indicate that there are something over 200 new beekeepers in the territory inspected. While this year 177 are recorded having discontinued beekeeping, there were 427 names of new beekeepers added to the list, making a net gain of 250.

VISIT OF ENGLISH AUTHORITY.

On May 3 Mr. C. Hanslope Bocock of Newmarket, England, presented a letter of introduction from the British Beekeepers' Association and the "Board of Agriculture." In England Mr. Bocock had been associated with the investigations of the adult disease of bees, called Isle of Wight disease, also known as Microsporidiosis, said to be caused by *Nosema apis*. It had been presumed in England that possibly the adult bee disease of the United States, called "bee paralysis," might be the same or a similar disorder, the symptoms being somewhat comparable. Further, the symptoms of the alleged spray poisoning of bees in Massachusetts and elsewhere are similar. For the purpose of studying the adult disorder occurring in this country, Mr. Bocock planned a circuit of the eastern half of the United States, stopping in Massachusetts first, where the inspector traveled with Mr. Bocock, visiting representative apiaries in practically every quarter of the State. Mr. Bocock spent in all about ten weeks with the inspector, in May, June and August. Visits were also made to apiaries in Connecticut, Long Island and in New York State. After finishing his work here, where he was supplied a table in the laboratory of the veterinary department of the Agricultural College, he left for Washington, afterwards visiting Chicago, Iowa and Ohio, then returning to Amherst. Some of the observations which have been made in this connection are recorded elsewhere.

BROOD DISEASES OF BEES.

While primarily the function of the inspector might be to suppress infection of contagious diseases in apiaries, the work is much more broad, ranging from the most elementary instruction to most advanced beekeeping discussions. It has been urged always, by the inspector, that the deputies give as

much time as is warranted to general assistance of the bee-keepers, aside from strictly disease problems. Such service has been offered even more this year than heretofore. Some might claim that general instruction takes time which should be used for disease suppression, yet in the long run it will be found that the time thus spent will earn large interest.

Brood diseases, particularly European foul brood, is the saddest side of beekeeping; without question it has gathered the heaviest toll from the apiarists. Fortunately, however, it can be checked — held at bay. The apiarist can keep at work despite the infection if he will attend to business. The general suppression, accomplished elsewhere in the country, is fast being realized in Massachusetts.

Each year, when new territory is inspected for the first time, or in localities where apiarists are not particular in keeping up the standard of their stock and maintaining freedom from infection, there is an increase in the number of apiaries which have had to be quarantined. This year the number was 255, which is slightly in excess of the figure for previous years; yet this does not represent the status of the disease situation as adequately as the figures below, wherein the numbers of infected colonies are presented. A large number of these apiarists have treated the disease and have been released, — in all, 201, — which includes 5 apiaries held in quarantine from the previous year. The next season, however, will show 94¹ apiaries held in quarantine, either for failure to complete instructions; inability or disinclination to follow the recommendations of the inspectors, in a word, delinquents; or, in a few instances, where funds have not enabled revisitation for the purpose of pronouncing the apiary freed from infection.

American Foul Brood. — American foul brood, once prevalent in the State, has largely passed, so that only occasionally are colonies found to-day. This year American foul brood infection totaled 80 against 104 colonies the year previous and 121 colonies in 1914. This is a relatively constant annual decline of from 17 to 24 colonies per year, respectively.

European Foul Brood. — By far the greatest percentage of brood diseases encountered in Massachusetts is European foul

¹ Fifty-four of which were quarantined in 1918, and 40 previously.

brood, of which 397 colonies were found infected. But this is a considerable reduction over 1915, as that year also showed a reduction over 1914. Thus year by year the number of infected colonies is being reduced. A more graphic representation is the ratio of this number of colonies to the number of apiaries in which European foul brood was found, it being 397 colonies infected in 189 yards. This, however, is but 1.17 per cent of the apiaries which were visited during the year.

There cannot be any doubt in any experienced apiarist's mind, nor can the competent inspector deny, that European foul brood is tricky, treacherous, evasive, subtle in symptoms, — in a word, is difficult to handle. Likewise it is less easily eradicated than American foul brood, which does not seem to possess the peculiar evasiveness of European foul brood, due to its so-called spontaneous disappearance. It is thought that this at times may occur on account of environmental and racial conditions. This peculiarity of European foul brood, however, affords a point of attack for the rational and painstaking beekeeper, which as yet is but imperfectly understood. It has long been recognized that European foul brood can be checked; in this the value of certain types or strains of Italians have been observed to possess peculiarly resistant qualities, which, according to some, are mere expressions of thrift, — “good housekeepers;” that is, they do not allow the dead to accumulate in the alleys. If a diseased larva appears it is apparently at once pulled out and disposed of before, it would seem, there can be any further spread to a neighboring cell. This form of thrift, however, may also be supported by a further physical character, more nearly approaching what beekeepers call “immunity to European foul brood.” Experiments have been and are being carried on in an attempt to analyze these circumstances. Already considerable light has been obtained, and the preliminary results are looked for in a publication now in preparation.

For the present, beekeepers are urged to use only the strains of Italians which appear to possess these resistant qualities, coupled, of course, with the other desirable characteristics. It will not be wise to perpetuate a strain which has in its history, especially recently, European foul brood. Requeen and re-

queen, using stock which does not show disease. This seems to be the safest insurance a beekeeper can take out on his stock. The time will surely come, if this method is followed, when many beekeepers will not be able to show the inspector a single case of European foul brood. This result has been brought about both here and in other States. But the speed with which the conditions will prevail over the State rests in a measure with the beekeepers, — their keenness in selecting their queens and their readiness to secure superior stock.

It is an unexpected pleasure to be able to report that some of the localities which a year or two ago were as European foul brood ridden as any in the State, this year showed not a single case. This applied to single towns in some instances, and also to a group of towns. Other localities are also reduced to almost disease-free condition.

American Foul Brood and European Foul Brood in One Colony. — Beekeepers from time to time have thought that they have had both American and European foul brood in a given colony. Inspectors occasionally from first examination find difficulty in determining which disease is present, or whether both may be present. A case of dual infection is reported this year from the laboratory of the Bureau of Entomology.¹ "In the examination of about 5,000 suspected samples of bee comb and brood from every section of the United States and several foreign countries, the writer has never until recently observed both American foul brood and European foul brood in the same comb." The present writer, however, is given to understand that there have been brought to attention some few isolated cases of dual infection prior to the present one. In fact, Dr. McCray says, "So far as the writer is aware this is only the second authentic report, confirmed by laboratory finding, of the presence of these two diseases in the same comb." The particular sample referred to is in Bureau of Entomology, Beekeeping No. 4982, from Patterson, Stanislaus County, California, diagnosed on May 4, 1916.

Sacbrood. — A year ago some unusual conditions with a malignant type of sacbrood were reported. During the current

¹ Arthur H. McCray, M.D., Agricultural Assistant, Bureau of Entomology. Report of the Finding of American Foul Brood and European Foul Brood in the Same Bee Comb. *Journal of Economic Entomology*, Vol. 9, June, 1916.

year no general infection has been observed, yet some cases are reported, as having been a severe tax on the colonies. A close record of this disease has been kept and includes any colony which showed even a few cells. The disease appeared in 60 apiaries.

The Untidy Yard. — There has been progress, however slight, in the effort of beekeepers to keep their apiaries sanitary. This season 298 orders for cleaning up scraps of comb, empty hives and general débris have been issued, including the 255 apiaries with disease.

DISEASES OF ADULT BEES.

Bee Paralysis. — Mr. Bocock on his arrival suspected that the so-called “*Nosema* disease,” or “Isle of Wight disease,” or, as it has been termed, “Microsporidiosis,” might be the same as the “bee paralysis” of the United States, which is usually characterized as a disorder of the southern States.

Typical cases of bee paralysis in New England have been few. However, during the past year a number of convincing cases were reported by the inspectors, and in many instances observed by the writer, together with Mr. Bocock. The first case observed was in Connecticut on June 3. This colony, headed by a Georgian Caucasian queen, was rapidly dwindling. Samples of bees were taken, as were samples from other questionably affected colonies in the same apiary, with the result that Mr. Bocock found only a few young forms of *Nosema apis* (sample No. 132). This colony was closely watched during the remainder of the season. After requeening it was reported to have recovered.

One of the worst cases observed during the season was that in Hampshire County (sample No. 142). Another apiary which was seriously depleted was on Long Island (samples Nos. 150–152).

In some instances the following treatment was applied with pronounced success: the colony was merely dequeened and allowed to remain so for a week or possibly more, whereupon a vigorous Italian queen was substituted. Usually all further symptoms of paralysis disappeared.

The case in Hampshire County, Massachusetts (sample No. 142), upon the examination of samples of adult and dying bees

by Mr. Bocock, revealed abundant young stages of *Nosema apis*. This colony and others under observation in Hampshire County have been under the supervision of a single apiarist, and each colony was headed by a queen procured from the same source at a distance. Some of these colonies did not recover; usually, however, from the lack of proper and prompt handling.

It was Mr. Bocock's final conclusion that paralysis, as known in the United States, differs from the Isle of Wight disease as experienced in England, although some of the symptoms are comparatively the same. It may be further concluded, for the present at least, that bee paralysis is not dangerously infectious or contagious, and that in some instances requeening will be found remedial.

Unusual Adult Mortality. — About the last of May, shortly after Mr. Bocock arrived,¹ he commenced to point out adult bees which he called "creepers," — abnormal in their behavior. These bees were often shiny, suggestive of the characteristics applied by beekeepers to "robber bees," which are usually thought to be old bees with frayed wings. The "creepers," however, were not entirely "old bees," but rather adult bees of all ages. These "creepers" may be characterized as having lost their power of flight; tossed into the air they sail down or drop heavily to the ground, not as a healthy, heavily laden bee who can direct her course and ease herself as she alights. They are often otherwise active, and have been described as "jumpers," typifying their continual effort to get somewhere by actively lurching forward at irregular intervals. Sometimes they creep to the top of a grass blade and tumble off; again, in short grass they may be seen "streaking" along, tumbling, rolling over and even taking short flights of a foot or so. Closer examination reveals one or both pairs of the wings unhooked, resulting in a crossing of the wings, a distortion.

These "sick bees" are laden with feces in many instances, "malodorous" and liquid, which they have difficulty in voiding. This may cause an abnormal appearance of the abdomen, a distention, perhaps causing the anterior of the abdomen to hang downward or even drag.

¹ May 26.

The legs, in what appears to be advanced symptoms, may be paralyzed, resulting in the loss of use of one or more pairs. Such bees have been observed on their backs "kicking," as it would seem, in an effort to right themselves.

There is a tendency for the stricken individuals to crawl from the hive, although they are noticeable often on combs removed from affected hives, particularly near the top or on the top of the frames. In crawling from the hive the more vigorous ones appear to be anxious to go to the field, if not aerially, over land, and have been found a hundred feet or more headed away from the hive. Some observers claim that these sick bees finally turn and return toward or into the hive. This could easily disseminate the malady; in fact, it is believed in England, as the Isle of Wight disease is understood, to progress with prevailing winds and by "drifting" of the bees. Not all individuals return to a colony, however, for a very noticeable symptom among the stricken bees is their "bunching" in the grass, on the hives and alighting boards. These bunches of bees appear to be tired of existence and probably soon perish, although some believe they may revive.

The mortality is not confined to the immediate vicinity of the colonies in the apiary. Stricken bees have been observed about the neighborhood of the apiary, "creeping" in the grass along paths, in clover lawns, dying or dead on flowers, and in some instances even bunched alongside a walk. This observation has been made in England, confirmed in Amherst by Mr. Bocock and others, and reported from other States.

It should not be concluded that this adult mortality is identical with the Isle of Wight disease of England, yet the symptoms herein mentioned are approximately the same as those outlined in the British Leaflet on "Microsporidiosis."¹

A description of the widespread prevalence of an adult mortality over the United States and probably Canada cannot be undertaken here. The writer has, however, observed the disorder in varying degrees of intensity in several localities of Massachusetts. It has been reported by the deputies, and from some of the largest apiaries in eastern and central New

¹ Microsporidiosis of Bees, or Isle of Wight Bee Disease. Board of Agriculture and Fisheries. Leaflet No. 253.

York State the trouble has caused considerable anxiety. In August the writer also saw suggestions of the persistence of the disease in the yards of some of these New York apiarists. Speaking with them on the subject, they were sure the wholesale destruction of their bees, by thousands and tens of thousands, had not occurred in former years. Moreover, one man, who first noticed it in one of his several yards, upon riding up and down the country, found the trouble in nearly every apiary, large and small, where he called. The press and beekeeping periodicals indicate that this or something similar is of even wider scope, including Ohio and probably the far west.

This report does not pretend to go into the circumstances, methods of examination and findings of this office, yet Mr. Bocock's diagnoses, which represent a beginning of a much-needed investigation, are presented. In some instances the writer's observations are included and are so indicated.

TABLE 1. — *Examinations for Nosema apis.*

SAMPLE No.	Date of Examination, Source and Character.	Locality. ¹	Findings.	Remarks.
110	June 13, 1916.	Middlesex County.	Meronts and spores, <i>Nosema apis</i> .	Microscopical examination.
113	June 20, 1916.	Middlesex County.	Some young forms; no spores seen.	Enough <i>Nosema</i> . Bees and queen from New Jersey, as a pound package.
115	June 21, 1916.	Essex County.	A few doubtful young stages only.	-
116	June 21, 1916.	Essex County.	Negative.	-
117	June 21, 1916.	Essex County.	Negative.	-
118	June 21, 1916.	Essex County.	A few doubtful young forms only.	-
119	June 22, 1916. "Bees shiny; abdomen much distended with liquid malodorous feces."	Hampden County.	Large meronts abundant; no spores seen.	-
121	June 22, 1916. Only 4 bees received alive.	Essex County.	Young forms; no spores seen.	-
122	June 22, 1916. Only 3 bees received alive.	Essex County.	Some young forms; no spores seen.	-
123	June 22, 1916. Only 4 bees received alive.	Essex County.	Young forms fairly numerous; no spores.	-
124	June 22, 1916. Only 4 bees received alive.	Essex County.	A few young stages; no spores seen.	-
126	Comb and scrapings from hive in which colony had died.	Middlesex County.	Negative.	-
127	June 27, 1916. Escort of a queen.	Ohio.	Heavy sporulation; <i>Nosema apis</i> abundant.	-
128	June 27, 1916. Few decayed adults from hive in which colony had died.	Hampshire County.	Advanced decomposition, many yeasts; no spores of <i>Nosema</i> found.	-
130	June 30, 1916. Queen escort.	New Hampshire.	Heavy sporulation; some young forms.	-
131	June 13, 1916. Shiny creepers.	Hampshire County.	Exceedingly heavy sporulation.	<i>Nosema apis</i> spores in masses plainly visible to naked eye.

¹ Counties are all in Massachusetts.

TABLE 1. — *Examinations for Nosema apis* — Concluded.

Sample No.	Date of Examination; Source and Character.	Locality.	Findings.	Remarks.
132	June 2, 1916. Shiny bees, so-called paralytic colony.	Connecticut.	A few young forms only.	Headed by Caucasian queen from Georgia. Colony had dwindled.
133	June 22, 1916. Sluggish bees remaining on grass and board where twenty-four hours previously a swarm had been hived.	Essex County.	Young forms; <i>Nosema</i> fairly plentiful. No spores detected. Considerable <i>musca</i> in one bee.	-
134	June 30, 1916. Escort of a queen.	New York State.	Negative.	-
135	July 1, 1916. Dried bees of escort in an old mailing cage.	Ohio.	Obtained spores.	-
136	June 19, 1916. Excrement.	Essex County.	Negative.	-
137	June 19, 1916. Excrement.	Essex County.	Negative.	-
138a	July 5, 1916. Paralytic and other bees.	New York State.	Young forms common; but one spore seen.	-
138b	July 5, 1916. Excrement.	New York State.	<i>Nosema</i> found.	-
141	July 10, 1916. Dried excrement.	Hampshire County.	Dried shriveled spores.	Found in front of hive.
142	July 9, 1916. Paralytic bees.	Hampshire County.	Young stages abundant.	-
143	July 10, 1916. Escort of a queen.	Alabama.	Negative.	-
145a	July 10, 1916.	Ohio.	Negative.	Guts normal macroscopically.
145b	July 10, 1916.	Ohio.	Negative.	Guts normal macroscopically.
147a	July 11, 1916. One bee dead in cage.	Ohio.	Negative.	Guts not normal macroscopically.
149a	July 11, 1916. Escort of queen.	Alabama.	Excessively heavy sporulation.	Fungus mycelium.
150a	July 11, 1916. Shiny bees; 9 dead on arrival.	New York State.	Meronts numerous.	Guts not normal.
151a	July 17, 1916. Shiny bees from queenless colony.	New York State.	Negative.	Guts not normal.

152 ¹	July 17, 1916.	Shiny bees from queenless colony,	New York State,	Meronta (?),	.	.	.	.	Guts white, not normal.
153 ¹	July 17, 1916,	.	New York State,	Negative,	.	.	.	.	-
154 ¹	July 19, 1916,	.	New York State,	Negative,	.	.	.	.	Whitish abnormal guts.
155 ¹	July 19, 1916,	.	New York State,	Negative,	.	.	.	.	Guts more normal, some whitish.
156 ¹	July 19, 1916.	Shiny bees; not "creepers,"	Hampshire County,	Meronta seemed numerous,	.	.	.	.	-
159	August 17, 1916.	Escort of queen,	New York State,	Negative,	.	.	.	.	-
160	August 11, 1916.	Reported abundance of "creepers,"	British Columbia,	Heavily sporulated with <i>Nosema</i>,	.	.	.	.	-
161	August 18, 1916,	.	New York State,	Negative,	.	.	.	.	-
164	August,	.	Washington, D. C.,	Negative,	.	.	.	.	"Some bees dead; bacteria; no <i>Nosema</i> ."

¹ Counties are all in Massachusetts.

* Determination by Burton N. Gates.

This phenomenon or disease was first observed in late May, only a few bees of a colony showing symptoms. Colonies which were under close observation for some weeks by Mr. Bocock and the writer had no appreciable mortality until about June 24 to 25, when all of a sudden the grass around the hives and for 50 feet or more was noticeably strewn with bees, creeping, crawling and hopping in all directions. The bees accumulated each day, commencing about 9 or 10 o'clock in the morning and dispersing after 3 in the afternoon. This continued for about a week or a little longer, when the colonies regained apparent normal flight. Close observation, however, for some weeks showed that the peculiar symptoms persisted in a few individual bees. It was thought that perhaps there was undue mortality in certain hives for a week or so after colonies became confined by cold days in November, but before winter conditions prevailed. These observations were made throughout the period in several apiaries of varying sizes, from 60 to 50 colonies.

Beekeepers should not yet be alarmed over these symptoms. Some large apiarists say they have seen the trouble before; that it appeared one year and did not the next. Its progress should be watched, however, and reports made of the findings. Undoubtedly the heavy mortality just prior to New England honey flow cannot but have its detrimental influence on the crop, for inevitably it would seem to cut down the foragers. Whether there will be further disaster, in winter, for instance, as is intimated elsewhere, and which characterizes the English disorder, is yet to be experienced. For the present, however, beekeepers must be patient until further experiments and observations can be made.

SPRAY POISON.

While not strictly a disease of adult bees, the alleged mortality of bees from injudicious or careless spraying, summarized in the last annual report of the Inspector of Apiaries, has still been under observation. In the current year, however, the season during the heavy spraying period was unfavorable to the work. Moreover, the periods of rain and cloudiness, as well as cold, kept bees housed. Whether these causes are accountable for

the fact that there were few reports of damage resulting from poisonous sprays, or whether the horticulturists and beekeepers are more closely guarding each other's interests, is not certain, yet exceedingly few reports of disaster were received.

Chemical Studies. — Progress in the investigation of the subject is being made. Dr. E. B. Holland, in his important technical paper referred to elsewhere, says, "The toxic dose [of arsenic] for bees is unquestionably small, whatever the figure," he having found "a small amount of arsenic" in 12 samples out of 23 submitted. Arsenic was also obtained from two samples of stored pollen.¹

Particularly noteworthy, also, are the results of Dr. Holland's technique in examinations for arsenic in bees, wherein the methods have been materially simplified and made more direct. His paper deals not only with the report of the result of the examination of the twenty-three submitted samples, but also outlines his methods of analysis, as for "destroying the organic matter," and finally closes with a discussion of the "toxic dose of arsenic in bees."

Repellent Sprays. — The writer has previously mentioned, publicly and in print, the possible discovery and development of spray materials repellent to honeybees. Some interest among investigators along this line has already been induced.

As a preliminary observation the writer on July 7, 1916,² applied spray to a European linden which was in full bloom. A tree as near typical as possible was selected. One-half only of the tree was sprayed with a lime sulphur solution of 1-25, — the strength usually employed. The spraying was done between 9.30 and 10 o'clock, in the morning of a bright, calm day.

As soon as the spray was applied the bees, which could be seen and heard buzzing in the tree, left that portion of the tree which was being sprayed. It is possible that a spray of water would have temporarily driven the bees out. However, unlike water, the lime sulphur apparently repelled the honeybees, at least for a time. That portion of the tree not having been sprayed continued to be worked by bees. Incidentally,

¹ Beekeeping samples Nos. 61 and 68.

² Under the auspices of the Agricultural College Experiment Station.

shortly after one of the lower branches of the tree had been sprayed, a honeybee was seen to return, but left abruptly.

Observations were made throughout the day at intervals and also on the following day and days. Counts of bees observable on the sprayed half of the tree were made. Immediately following each count similar counts were made in the unsprayed half. In no instance were there as many bees to be observed in the sprayed portion as in the unsprayed portion, yet the total which appears below, of bees observed, is not sufficient to be of absolute significance. Apparently, too, after the first day there was an increased number of bees in the sprayed portion, although there was a seeming falling off of the number of bees in the unsprayed portion, a balancing which suggests the loss of repellent powers in the sprayed portion and a decrease in the general activity of the bees working linden; hence the observations may be questioned. Finally, on the third or fourth day, scarcely a bee could be seen in any portion of the tree. Examination of other European linden trees about the campus showed comparable conditions. While some of the trees were in full bloom others had passed. Apparently honeybees were not working all linden bloom as they do sometimes.

To summarize, the following comparative observations are presented: —

TABLE 2. — *Results of Lime Sulphur as a Repellent.*

In the sprayed half of the tree: —

15 honeybees.

Some wild bees.

1 milkweed butterfly.

Flies of various types numerous.

In the unsprayed half of the tree: —

53 honeybees.

Wild bees.

Flies numerous.

4 Bombus.

The Municipal Use of Repellent Sprays. — One of the cities in Massachusetts which is reported to have suffered a severe loss among the bees — due, as it is alleged, to their having been poisoned by sprays used particularly in forest and shade-tree spraying — is Newton. Quoting from a letter, the writer says: —

For several years we have had more or less complaint, especially in the Waban section, that at the time of spraying colonies of bees were practically exterminated. Last year I tried notifying all those I knew who kept bees that we would be spraying at or about a certain time, and requested that their bees be closed up for a few days during this period. I had hoped that this might prove satisfactory, but I am afraid it did not, as the result showed that a great many bees were killed last year [1915], due in a great many cases to the fact that rainy and stormy weather interfered with our schedule of spraying, so that we were unable to spray in a certain section when we had planned to.

Such an arrangement, while it might appear theoretically possible from the beekeeper's standpoint, could hardly be expected to give general relief. The use of repellent sprays, however, ought to give greater protection. Fortunately the writer's proposal has been tried by the city of Newton during the year 1916, at the particular suggestion of Mr. Gourley, a resident beekeeper. He and others of whom the writer has inquired report very favorable results.

A fumigant of the sulphonaphthol type, used largely for disinfecting purposes and known as "Milkol," was "used in proportions of 1 pint of Milkol to 100 gallons of arsenate of lead solution. According to the reports so far [July 24, 1916] the results have seemed to prove satisfactory. The present year we used this only in one section of the city. If we have complaints in the future from any other section where bees are kept I shall be glad to use the mixture there; in fact, I think the cost of using it in all our spraying operations, all over the city, would not be very great."¹ This marks the first municipal effort toward co-operation among intensive sprayers with beekeepers. It is hoped that like experiments may be tried elsewhere.

APIARY SUPERVISION.

Co-ordinated with the disease investigations, referred to in "Miscellaneous Work" of the service, an apiary in Wilbraham, which had shown the presence of European foul brood for several successive years, was taken over on July 27 to be directed by the inspector. The apiarist had previously met with only partial success in the treatment of his colonies, due to several factors. Discouraged, he was inclined to destroy all diseased

¹ Letter from Forest Commissioner Wm. W. Colton.

colonies and trust to luck for the remainder. Even at so late a date as approximately August 1, it was deemed advisable to demonstrate that this apiary could be saved. Immediate steps were taken. The condition of the apiary is tabulated as follows:—

TABLE 3. — *History of Wilbraham Experimental Apiary.*

DATE.	Number of Colonies.	Number of Colonies Diseased with European Foul Brood.
July 26, 1915,	28	8
June 23, 1916,	24	13
July 27, 1916,	26	17
September 2, 1916,	23 ¹	1 ²

While it cannot be said that the apiary is yet entirely freed from the disease, it being quite possible and probable that there will be a recurrence of it in 1917, yet the apiary was preserved practically intact and made ready for winter. Combs were not destroyed, as is usual in the shaking treatment; moreover, some honey was taken after the direction of the apiary was started, previous to which, however, little or no honey had been obtained. The demonstration thus far is largely suggestive, and can only be concluded after another season's work. It is highly convincing, however, that it was entirely unnecessary to sacrifice 17 colonies of bees, with the probability that some of the remaining 9 would later have had to be sacrificed. In the short space of a very few weeks the apiary which could have been appraised at only a low figure was becoming of value. The direction of this apiary next season should bring it into profitable condition.

WINTER LOSS.

Through the records of the inspection work, a close estimate of the percentage of mortality among colonies of bees is annually obtained. In the sixth annual report a statistical table was presented. The figures for the past winter, 1915-16, are based

¹ Two weak colonies had been united for the purpose of controlling the infection.

² Suspicious, but not definite.

on records of 835 apiaries, there being in these 3,516 colonies, fall count. In the spring of 1916 these apiaries had lost 882 colonies, or 25 per cent, the spring count being 2,634 colonies. The winter loss among these apiaries, however, has been practically made up, the present count, as closely as can be ascertained, being 3,504 colonies.

For the winter of 1916-17 bees have gone into winter conditions strong and well stored. Fortunately, with sugar at high figures, it was not necessary to feed for winter stores to any great extent. In apiaries where the colonies have been protected or carefully housed, as in the cellar, there should be a slight mortality, barring, of course, disastrous climatic or disease conditions during the current winter. It may be recorded that disaster or fatality of colonies suffering from Isle of Wight disease, as experienced in England, is particularly a winter mortality, and hence should this malady be found to occur in this country, comparable disaster might be anticipated. As yet, however, there is nothing which would particularly forecast this winter mortality.

SUGGESTED LINES OF WORK FOR THE INSPECTION SERVICE.

There are a number of lines of work suitable for the apiary inspection service which may be proposed. Your secretary in his report has already alluded to one, — the rearing of select queen bees. He has also said that one of the most urgent things for the success of Massachusetts agricultural development is "capital." The apiary inspection service needs capital. With the funds available the work can only be partially carried on. Given additional capital, however, it would be quite possible to increase the amount of inspection service, and at the same time expand it along collateral lines.

Wax Rendering. — Wax rendering for the beekeepers is carried on at the Agricultural College, and vast quantities of raw material are reduced to marketable form. Much, possibly 75 per cent, of this raw material would be destroyed by the beekeepers were it not for the rendering facilities offered. The rendering of old combs in small quantities or in large quantities is a tiresome, dirty process, even when the beekeeper is lucky enough to have sufficient equipment, which may cost

more than he would be warranted in laying out. The purpose of the central rendering plant is based on a double saving for the beekeeper: first, by sending his comb for extraction a higher per cent of marketable wax is obtained than it is usually possible to obtain by home rendering processes; second, it is cheaper to pay a nominal fee for the rendering service, and also the transportation charges, than to render the wax insufficiently by home processes. Moreover, shipments to buyers of wax or makers of foundation can be made from the central plant in larger quantities and at a cheaper transportation rate than the beekeeper can get for his small shipment.

The figures obtained as experimental data from rendering these large quantities of raw material should be of ultimate benefit to the beekeeper and wax worker, demonstrating efficiency, shrinkages and the presumed difference in character of raw materials and products. These data it is expected will soon be available in a publication.

Central Honey Handling Station. — As the central wax rendering service is a demonstrated success, so it may be advisable to centralize the handling of other crops of beekeepers, as, for instance, their honey. In some States already comb honey is co-operatively graded and marketed. The writer is not aware of any co-operative extracting or bottling. It may readily be forecasted, however, that a co-operative extracting plant, say for a limited district of extracted honey production, might be made eminently successful. This being the case, the development of this phase of honey handling might naturally result in a central bottling establishment.

The Public and Honey. — In the handling of honey it has become more manifest this year than in the past that the public is more deeply interested in the utilization of honey than heretofore. To the surprise of all beekeepers, even in this year of large crops, their product has moved more rapidly than in any year previous. Never, as one man has expressed it, in his recollection of beekeeping has honey moved out of the hands of the producer so rapidly. Up to the first of August a prominent beekeeper of Illinois having 525 colonies in the spring, as he announced at the several beekeepers' conventions in Massachusetts, had harvested 90,000 pounds of extracted honey. It

was then estimated that probably 60,000 pounds more would be taken, — in all an average of about 290 pounds per colony, spring count.

It might well be the function of the apiary inspection service to promote the interest and reliance of the public on Massachusetts honey. Only a small portion of the honey consumed in the State is locally produced, but this output can be increased; also, those marketing honey can supplement their own product with equally good grades of honey from elsewhere in New England or the east. It might well be the function of the inspection service to further the public interest in the utilization of honey and the producers' and bottlers' interest in the marketing of honey.

The Raising and Distribution of Queen Bees. — As has been suggested in the report of your secretary, in order to safeguard the interest of Massachusetts beekeepers and possibly (while it has not been demonstrated) eliminate the possible transmission of infectious diseases of bees through the introduction of foreign queens, the State might well maintain a queen-rearing apiary for the purpose of producing superior queens for distribution in Massachusetts. It has not been determined whether this could be done so as to reduce the current price of queens, whether a part of the expense of the raising of queens might be borne by local beekeepers' associations and the State, or whether the queens might be distributed at cost. State queen rearing is not new; the project has been taken up by both State and Federal governments. During the current year at least one State has reared and distributed queens to her beekeepers. In at least one province of Canada a provincial beekeepers' society has procured reputable queens for its members. Should it not be desirable for Massachusetts to rear queens for her beekeepers, it might be well to assist in procuring reliable, prolific and healthy stock by taking, say, a portion of the queens reared by a given producer.

Concerning this subject Massachusetts has peculiarly appropriate localities for the production and mating of pure stock. Should this service be undertaken, every emphasis should be laid on procuring stock not only high in honey-producing qualities, but also high in qualities resistant to European foul brood.

While Massachusetts has had for years an acknowledged reputation of having from two to five queen producers, lately these have discontinued their business, and but few queens are now locally produced for sale. A physical limitation on Massachusetts queen rearing is the nature of her late springs, wherein only with difficulty are the first few weeks of the queen-rearing season carried on.

Displays at Fairs and Expositions. — Akin to some of the proposals herewith outlined is the importance of making displays of bees, beekeepers' equipment and especially products, from an educational standpoint, at local and State fairs and expositions. The dairy show of this year has particularly demonstrated the possibilities, which as yet have been but partially worked up. Educationally, this problem has two phases, — the benefit to the beekeeper and the benefit to the consumer. The beekeeper has opportunity for consultation, the learning of new methods and the seeing of new materials, while the public increases its insight into the nature of honey, how it is procured and produced, and gains a closer contact with the beekeeper. The public enjoys buying of the producer. In many instances, through a display at a fair, the public gains its first acquaintance with honey. Those few beekeepers who have made sales of honey at fairs know how eager the public is to buy. This sale of honey at fairs, while yet immature in its development, has peculiar educational value. Even though the marketing of the crop of 1916 has been phenomenal, showing that there is a public demand for very large quantities of honey, yet it is only due the public to further demonstrate to them the value of the use of honey in the home. This in turn would be of direct assistance to the beekeeper.

MISCELLANEOUS WORK.

Publications. — As usual the apiary inspection service has distributed large numbers of bulletins, including publications issued by the United States Department of Agriculture. This department, however, has not issued this year any publication suitable for distribution to the entire mailing list in Massachusetts, as has been heretofore customary.

Bulletin No. 10, which has been issued in divided form as

Bulletin No. 10A of the Apiary Inspection Series of the Board of Agriculture, is entitled "Sixth Annual Report of the State Inspector of Apiaries for the Year 1915."

There was distributed to a limited extent a very technical publication¹ by Dr. E. B. Holland of the Massachusetts Agricultural College Experiment Station which appeals to the specialist and experimenter.

Meetings. — The usual number of beekeepers' society meetings, field days and conventions, of grange meetings and lectures before college biological societies, have been given during the current year. Of the meetings held before beekeepers' societies the most notable is the circuit series arranged by the inspector for Mr. C. P. Dadant, editor of the "American Bee Journal," Hamilton, Illinois, who addressed on successive days during the latter part of July and August nine beekeepers' societies in New Jersey, Connecticut, Massachusetts, Vermont and New York. The writer accompanied Mr. Dadant on a part of his engagements, meeting him in Connecticut and going with him throughout Massachusetts and into New York State. It is highly advantageous to the beekeeping interests of the State to utilize prominent apicultural talent by arranging sequential conventions or meetings. It is necessary, however, that some one person act as a booking agent for the many beekeepers' societies, which service the inspector is glad to render. A similar series of meetings was arranged for Mr. F. C. Pellett of Iowa, who spoke in the east in January.

Special Exhibitions. — Besides the speaking engagements there have been special demonstrations and exhibits, notably at the Amherst Fair, Greenfield Fair and the National Dairy Show. For the display at the Greenfield Fair, under the auspices of this Board, a part of the Massachusetts Agricultural College exhibit equipment was utilized. At the dairy show in Springfield, of which your secretary has already made mention, the beekeeping display was essentially that of products, and consisted of honey raised at the college apiary as well as by the beekeepers.

Bee Disease Investigations. — While not a part of the specific work of the inspection service, the bee disease investigations

¹ Detection of Arsenic in Bees. Excerpt, Journal of Economic Entomology, Vol. 9, No. 3, 1916.

carried on under the direction of the Agricultural College Experiment Station have concerned your inspector in many ways. The investigational work is closely linked with the field work; through the latter much valuable material is obtained both in specimens and observations. In this report it is usual to refer briefly to the results of this line of disease work, which at present is temporarily discontinued, Mr. Arnold P. Sturtevant having resigned to engage in similar research for the Bureau of Entomology of the United States Department of Agriculture. The results of the investigations, which are of particular importance to the beekeepers, and which have been carried on in a number of apiaries both in Amherst and elsewhere, will be reported in a separate publication.

FINANCIAL STATEMENT, NOVEMBER 30, 1916.

Appropriation,		\$2,000 00
Services of inspectors,	\$1,171 00	
Traveling and necessary expenses,	673 06	
Postage,	38 81	
Printing and office supplies,	14 88	
Stenographic and clerical services,	101 75	
	<hr/>	1,999 50
Balance,		<hr/> \$0 50

Respectfully submitted,

BURTON N. GATES,
State Inspector of Apiaries.

AMHERST, MASSACHUSETTS,
December 5, 1916.

TWENTY-SIXTH ANNUAL REPORT
OF THE
DAIRY BUREAU
OF THE
MASSACHUSETTS BOARD OF AGRICULTURE,
REQUIRED UNDER
CHAPTER 89, SECTION 12, REVISED LAWS.
JANUARY 13, 1917.

DAIRY BUREAU—1916.

OMER E. BRADWAY, MONSON, *Chairman.*

GEORGE W. TRULL, TEWKSBURY, P. O. LOWELL, R. F. D.

GEORGE E. TAYLOR, JR., SHELBURNE.

Secretary.

WILFRID WHEELER, *Executive Officer and Secretary of the State
Board of Agriculture.*

General Agent.

P. M. HARWOOD,

ADDRESS, ROOM 136, STATE HOUSE, BOSTON.

REPORT OF THE DAIRY BUREAU.

The work of the Bureau for 1916 has been notable on account of the interest, manifested by the large number of entries, in the clean milk contest; and the increased call for demonstrations, lectures, pamphlets, etc., relating to the food value of milk; also by the small number of violations of oleomargarine and renovated butter laws. The Legislature of 1916 was asked by the State Board of Agriculture to appropriate \$50,000 annually for three years to encourage and improve the dairy and live-stock interests of the State. The committee on agriculture reported the resolve, but reduced the amount to \$15,000 annually. The ways and means committee, however, still further reduced the amount appropriated to \$5,000 per year, which left the matter virtually to be a call for continuation of the special work already begun by the Dairy Bureau of the Board and continued during the three previous years. In pursuance of this resolve \$2,700 was offered in prizes for a clean milk contest. A new plan of awarding prizes was adopted because the time had come when the difference in results was so slight in individual cases that it could be determined only with the use of a high-power magnifying glass. Heretofore the prizes had been awarded in one, two, three order. This year the prizes were awarded in three classes, namely, superior merit, merit and honorable mention. There were three divisions of contestants, namely, (a) owners, (b) juniors, and (c) employees. The total number of applicants was 653, of which 578 competed in the contest. Out of this number 132 won superior merit; 101 merit; and 81 honorable mention; a total of 314, or more than one-half the total contestants. It should be remembered that the object of this contest is to educate and encourage clean milking, a fundamental necessity in securing a clean product. In addition to the foregoing prizes \$250 was offered co-operative creameries for excellence in condition of cream as delivered.

FOOD VALUE OF MILK.

In 1910 the secretary of the State Board of Agriculture, at the request of the Dairy Bureau, asked Professor Washburn of Vermont to deliver a lecture on "Food Value of Milk" at its Public Winter Meeting. This lecture was later repeated in Worcester at the expense of the Bureau. Shortly afterwards the general agent wrote "Circular No. 1," of which several editions were issued and rapidly exhausted, and the subject "Food Value of Milk" was added to his list of lectures. In 1914 and 1915 several editions of "Leaflet A" were issued. In 1916 an illustrated folder was published and nearly 100,000 copies have already been distributed. We believe this work has been productive of good results.

LECTURES.

The general agent has delivered 19 lectures upon dairy subjects during the year, and has attended several dairy conferences at Washington and represented the secretary at the organization of the National Association of Commissioners and Secretaries of Agriculture.

BACTERIOLOGICAL LABORATORY.

The Bureau has equipped a bacteriological laboratory in Greenfield which will be operated for the present by the Franklin County Farm Bureau. The establishment of this laboratory is an experiment, and from the present outlook it appears that it will be found to be of great benefit to the farmers in its locality.

NATIONAL DAIRY SHOW.

The National Dairy Show was held at the Eastern States Exposition grounds, Springfield, and was perhaps the most notable event of the year. The Dairy Bureau contributed and Mr. A. W. Lombard had general charge of Massachusetts building exhibits, which were highly commended by visitors. Mr. Lombard presided at the meetings of the International Association of Dairy and Milk Inspectors and was re-elected first vice-

president for the ensuing year. The show as a whole was splendid and the effect upon the dairy industry of the State should be the awakening of new enthusiasm and endeavor.

DAIRY SITUATION.

It is with pleasure that we note an increase of 2,618 cows taxed in 1916 over 1915, and also the increased price which the dairyman is now receiving for his milk. Best of all is the fact that apparently the time has come when an increase in the price of milk is not so seriously objected to as formerly. To be sure, some consumers are using less milk as the price advances, but that milk is relatively cheap as compared with other forms of animal food is coming to be realized. Milk receipts in Boston indicate increased consumption. (See page 164.) The year now ending discloses the situation of a comparative milk shortage acknowledged even by the milk contractors themselves. This is largely due to the enormous demand for evaporated and powdered milk abroad. Milk in Massachusetts towns is now selling at 8 and 9 cents per quart and in some instances (as on the Cape) at 12 to 14 cents. The price of ordinary market milk in Boston is 10 cents per quart, fancy grades ranging from 12 cents upward, and in most instances at an advance over former prices.

In the early part of the year the Interstate Commerce Commission held an investigation of the railroad rates pertaining to the milk supply of several large centers in this country. The first of these meetings was held in Boston. The result of this investigation is that the former unsatisfactory condition has been straightened out and fair and just rates established. These rates increase with each 20-mile circuit distance from Boston, applicable only to interstate traffic. The abolishment of the so-called leased-car system was accomplished. Nearly every dairy interest in the State, and in fact in New England, was represented at this hearing which was thoroughly exhaustive in its investigation. The Board of Agriculture was efficiently represented by the Attorney-General of the Commonwealth. The general agent attended the hearings and offered several witnesses, and the testimony of the one accepted, Mr. Clifton E. Walcott of Barre, proved of great value. We congratulate all

concerned on the outcome of this investigation. We are pleased to note further that there are now on foot definite and well-considered plans for solid co-operation of milk producers in both small and large units in this State. Such co-operation, if effected and carried out in proper spirit, can but be of material and lasting benefit to the milk producers. More and more it is settling into the minds of our people that the solution of the milk producer's troubles is not so much a matter of legislation as it is a matter of co-operation and business efficiency.

CONDENSED MILK.

The Boston Chamber of Commerce reports that the amount of condensed milk handled in Boston in 1916 was 2,945 barrels and 762,446 cases. This is a decrease of 2,431 barrels from the number of barrels handled in 1915 and an increase of 352,974 cases. (See table on page 163.)

OLEOMARGARINE.

The number of licenses in force in the State in 1915 was 1,089, and in November, 1916, was 916, including two manufacturers' licenses. In Boston the number of packages handled as reported by the Chamber of Commerce in 1915 was 69,041; the number in 1916 was 40,988, a decrease of 28,053 cases. (For additional statistics see table on page 161.)

RENOVATED BUTTER.

In 1915 there were 39,056,180 pounds of renovated butter produced in the United States, while in 1916 there were 34,514,527 pounds, showing a decrease of 4,541,653 pounds. (See table on page 162.)

BUTTER.

The Chamber of Commerce reports the average wholesale price of butter in Boston market for 1916 as 33.7 cents, an increase of 4.5 cents per pound over that of 1915. The consumption of butter, Boston output, during 1915 was 81,617,503 pounds, while in 1916 it was 79,279,456, showing a decrease of 2,338,047 pounds, due undoubtedly to the increased price. It is unusual to note an apparent decrease in consumption of

butter, oleomargarine and renovated butter all in one year. So far as butter is concerned this should never be the case in a community where the population is increasing. Butter is a relatively cheap, heat and energy producing food even at present prices.

LOCAL MILK INSPECTORS.

The number of local milk inspectors in this State is increasing each year, there now being one hundred more than in 1910. Most of these men are doing excellent work in their respective localities. They are intelligent, enthusiastic and ready to co-operate and this Bureau has found them of great assistance in promoting any work tending to improve the condition of the milk supply. They have a strong State association.

PERSONNEL OF THE BUREAU.

The personnel of the Bureau is as follows: Omer E. Bradway of Monson, chairman, George W. Trull of Tewksbury and George E. Taylor, Jr., of Shelburne. The executive force, agents, analysts, etc., are as follows: executive officer and secretary, Wilfrid Wheeler; general agent, P. M. Harwood; analysts, B. F. Davenport, M.D., Boston, and Gilbert L. Clark, Emerson Laboratory, Springfield; agent, A. W. Lombard; and five others have been employed temporarily.

Mr. Charles M. Gardner of Westfield, who served as chairman of the Bureau for several years, retired at the beginning of 1916. The State owes a debt of gratitude to Mr. Gardner for his efficient service during the troublesome years of dairy agitation.

SUMMARY OF POLICE WORK.

Total number of inspections,	5,661 ¹
Number of inspections where no samples were taken,	4,759
Number of samples of butter, oleomargarine and renovated butter, all purchased,	752
Number of samples of milk and cream,	80
Cases entered in court,	19
Convictions,	19
Addresses by general agent,	19

¹ There were 70 extra samples taken during the year, therefore this number is 70 less than the sum of the next three items.

Cases prosecuted during the twelve months ending November 30, 1916, by months and courts, with law violated, and results, are as follows:—

Court.	Month.	Num-ber.	Law violated.	Con- victed.	Nol- prossed.
Dedham, Northern Norfolk Dis- trict.	December, .	1	1 milk, . . .	1	-
East Brookfield, Western Worces- ter District.	January, .	1	1 milk, . . .	1	-
Lowell Police,	January, .	6	6 renovated butter,	6	-
Worcester, Central Worcester District.	February, .	2	2 milk, . . .	2	-
Attleboro, Fourth Bristol Dis- trict.	February, .	2	2 renovated butter,	2	-
Barre, Trial Justice,	February, .	1	1 milk, . . .	1	-
Fitchburg Police,	March, .	6	4 oleomargarine, 2 renovated butter,	6	-
Total, . . . . .	. . . . .	19		19	-

NOTE. — The Bureau is indebted to the milk inspectors of Massachusetts for assistance which has resulted in court cases.

The charges in the several cases entered in court for the year ending November 30, 1916, have been as follows:—

Furnishing oleomargarine in restaurants, etc., without notice to guests,	2
Selling renovated butter in unmarked packages,	10
Selling adulterated milk,	5
Selling oleomargarine in unmarked packages,	2

19

The following table shows the inspections without samples, and the number of samples taken during the past fourteen years:—

YEARS.	Inspections without Samples.	Samples.
1903-15 (inclusive),	73,142	21,446
1916,	4,759	902
Total for fourteen years,	77,901	22,348
Average,	5,564	1,596

OLEOMARGARINE.

The following figures, taken from the annual report of the United States Commissioner of Internal Revenue for 1916, show the production, withdrawn tax paid, withdrawn for export, and withdrawn for use of the United States, of the two classes of oleomargarine, as defined by act of May 9, 1902, covering the period of fourteen years since it went into effect on July 1, 1902:—

Oleomargarine (Pounds).

YEARS.	PRODUCT TAKED AT RATE OF 10 CENTS PER POUND.				PRODUCT TAKED AT RATE OF ¼ CENT PER POUND.			
	Pro- duced.	With- drawn Tax paid.	With- drawn for Export.	With- drawn Free of Tax for Use of the United States.	Produced.	With- drawn Tax paid.	With- drawn for Export.	With- drawn Free of Tax for Use of the United States.
1903. . .	5,710,407	2,312,493	3,334,969	-	67,573,689	66,785,796	151,693	-
1904. . .	3,785,670	1,297,068	2,504,940	-	46,413,972	46,397,984	123,425	-
1905. . .	5,560,304	3,121,640	2,405,763	-	46,427,032	46,223,691	137,670	-
1906. . .	4,888,986	2,503,095	2,422,320	-	50,545,914	50,536,466	78,750	-
1907. . .	7,758,529	5,009,094	2,695,276	-	63,608,246	63,303,016	129,350	-
1908. . .	7,452,800	4,982,029	2,522,188	-	74,072,800	73,916,869	109,480	-
1909. . .	5,710,301	3,275,968	2,403,742	-	86,572,514	86,221,310	112,958	-
1910. . .	6,176,991	3,416,286	2,767,195	-	135,685,289	135,159,429	97,575	-
1911. . .	5,830,995	2,764,971	3,054,344	-	115,331,800	115,448,006	91,750	-
1912. . .	6,235,639	3,174,331	3,044,122	-	122,365,414	121,945,038	106,160	-
1913. . .	6,520,436	4,090,658	2,417,973	3,300	138,707,426	138,242,848	59,686	-
1914. . .	6,384,222	3,831,706	2,121,162	469,340	137,637,054	137,747,982	22,540	110,020
1915. . .	7,595,141	3,753,012	3,081,356	734,030	138,214,907	137,693,610	31,172	-
1916. . .	6,748,940	3,403,287	2,561,613	746,281	145,760,973	145,443,578	26,076	2,250
Totals. .	86,359,361	46,935,638	37,336,963	1,952,951	1,368,917,030	1,365,065,623	1,278,285	112,270

RENOVATED BUTTER.

The following figures, from the same source as the preceding table, show the production and withdrawn tax paid of renovated butter, 1902-16:—

Renovated Butter (Pounds).

YEARS.	Production.	Withdrawn Tax paid.
1903,	54,658,790	54,223,234
1904,	54,171,183	54,204,478
1905,	60,029,421	60,171,504
1906,	53,549,900	53,361,088
1907,	62,965,613	63,078,504
1908,	50,479,489	50,411,446
1909,	47,345,361	47,402,382
1910,	47,433,575	47,378,446
1911,	39,292,591	39,352,445
1912,	46,387,398	46,413,895
1913,	38,354,762	38,285,114
1914,	32,470,030	32,513,244
1915,	39,066,180	38,924,828
1916,	34,514,527	34,572,335
Totals,	660,708,820	660,292,943

BUTTER.

The following table shows the average quotation for the best fresh creamery butter, in, a strictly wholesale way, in the Boston market for the last ten years, as compiled by the Boston Chamber of Commerce:—

MONTHS.	1916. Cents.	1915. Cents.	1914. Cents.	1913. Cents.	1912. Cents.	1911. Cents.	1910. Cents.	1909. Cents.	1908. Cents.	1907. Cents.
January,	32.0	32.5	32.5	33.9	36.9	28.8	33.5	30.9	29.7	30.4
February,	32.0	31.1	28.8	34.9	32.5	26.9	30.5	30.0	32.1	31.7
March,	34.5	30.3	27.7	36.4	32.1	24.2	32.0	29.1	30.2	30.2
April,	35.9	30.1	25.1	34.5	32.7	21.7	31.5	27.9	28.4	32.2
May,	35.4	28.7	25.8	28.7	30.4	22.8	29.0	26.6	24.1	31.4
June,	29.7	28.5	27.5	28.2	27.9	24.2	28.2	26.4	24.5	24.3
July,	29.0	27.3	27.9	27.5	28.1	26.0	28.6	27.2	23.6	25.9
August,	31.2	26.0	30.1	28.2	27.1	27.2	29.6	28.2	24.5	26.0
September,	33.6	27.1	30.9	31.3	29.1	27.7	29.6	31.3	25.3	29.2
October,	35.1	28.5	30.9	31.2	31.0	30.4	29.4	31.7	27.5	29.9
November,	37.6	29.1	32.4	31.9	32.9	32.5	30.2	31.4	29.5	27.1
December,	38.5	31.2	32.7	33.8	34.0	35.0	30.0	32.9	31.0	27.5
Averages,	33.7	29.2	29.4	31.7	31.2	27.3	30.2	29.5	27.5	28.8

The Chamber of Commerce figures regarding the butter business in Boston for 1915 and 1916 are as follows:—

	1916. Pounds.	1915. Pounds.
Carried over in storage,	9,119,100	8,963,202
Receipts for January,	2,848,659	3,353,765
February,	3,769,297	3,089,346
March,	2,911,830	3,996,912
April,	4,052,249	5,674,340
May,	8,863,803	7,797,597
June,	16,361,341	16,267,690
July,	13,375,446	14,473,792
August,	9,680,632	10,149,845
September,	6,629,494	7,882,845
October,	5,188,022	4,273,764
November,	3,148,953	2,943,272
December,	2,475,818	2,178,513
Total supply,	88,424,634	91,044,883
Exports for year, deduct,	698,142	308,380
Net supply,	87,726,492	90,736,503
Storage stock ¹ January 1, deduct,	8,447,036	9,119,000
Consumption for year,	79,279,456	81,617,503

¹ Stock of Terminal Refrigerating Company not included January 1, 1917.

RECEIPTS OF CONDENSED MILK.

The Chamber of Commerce figures regarding the receipts of condensed milk at Boston for 1915 and 1916 are as follows:—

	1915.		1916.	
	Barrels.	Cases.	Barrels.	Cases.
January,	60	24,915	102	28,588
February,	226	41,733	71	36,339
March,	201	40,436	130	52,484
April,	302	39,980	233	46,987
May,	237	27,491	342	124,630
June,	264	37,407	998	113,489
July,	940	33,428	304	70,044
August,	1,223	22,515	53	70,780
September,	470	28,692	125	79,595
October,	1,222	29,877	49	68,745
November,	167	51,748	465	44,145
December,	64	31,250	73	26,620
Totals,	5,376	409,472	2,945	762,446

MILK.

Milk brought into Boston by Different Railroads, December 1, 1915, to November 30, 1916, as reported by the Public Service Commissioners (Quarts).

DATE.	Boston & Albany.	Boston & Maine.	New York, New Haven & Hartford.	Totals.
1915.				
December,	615,403	6,808,526	1,521,927	8,945,856
1916.				
January,	701,161	6,957,325	1,627,965	9,286,451
February,	727,720	6,686,546	1,496,699	8,910,965
March,	382,592	7,271,876	1,614,443	9,268,911
April,	718,742	7,028,386	1,669,509	9,416,637
May,	845,125½	7,957,182	1,814,785	10,617,092½
June,	820,126	7,353,317	2,084,549	10,257,992
July,	1,073,899	7,316,241	2,125,203	10,515,343
August,	1,107,427	7,123,805	2,110,465	10,341,697
September,	966,061	6,787,075	2,022,766	9,775,902
October,	896,028	7,847,783	1,863,593	10,607,404
November,	757,767	8,514,086	1,300,111	10,571,964
Totals,	9,612,051½	87,652,148	21,252,015	118,516,214½

Milk brought into Boston annually by Railroads for the Years Ending November 30, 1906, to November 30, 1916, inclusive (Quarts).

1906,	114,233,967
1907,	109,882,190½
1908,	103,831,278½
1909,	108,082,936
1910,	100,606,362½
1911,	90,092,772
1912,	104,019,234
1913,	107,306,849
1914,	103,638,225
1915,	109,507,950¾
1916,	118,516,214¾

Comparative List of Number of Cows assessed in Massachusetts, May 1, 1906, April 1, 1915, and April 1, 1916.

COUNTIES.	1906.	1915.	1916.	DECREASE.		INCREASE.	
				1906-16.	1915-16.	1906-16.	1915-16.
Barnstable,	2,448	2,249	2,200	248	49	-	-
Berkshire,	17,404	14,113	14,509	2,895	-	-	396
Bristol,	13,702	12,447	13,477	225	-	-	1,030
Dukes,	656	637	681	-	-	25	44
Essex,	17,131	12,776	12,573	4,558	203	-	-
Franklin,	12,715	10,382	10,757	1,958	-	-	375
Hampden,	12,096	9,302	9,118	2,978	184	-	-
Hampshire,	14,383	11,433	11,585	2,798	-	-	152
Middlesex,	29,508	22,892	23,800	5,708	-	-	908
Nantucket,	378	420	359	19	61	-	-
Norfolk,	11,200	9,235	9,246	1,954	-	-	11
Plymouth,	8,465	7,477	7,663	802	-	-	186
Suffolk,	1,186	837	812	374	25	-	-
Worcester,	40,544	30,816	30,854	9,690	-	-	38
Massachusetts, . . .	181,816	145,016	147,634	34,207	522	25	3,140

Net increase for State, 1915-16, 2,618.

List of Massachusetts Farms making Milk of Superior Quality and Cleanliness and selling their Product higher than the Regular Market Price.

LOCATION, FARM.	Owner and Manager.	Approximate Number of Cows.	Where marketed.
Agawam, Reilly Farm,	J. J. Reilly, owner and manager.	17	Springfield.
Agawam, Colonial Farm,	H. E. Bodurtha, owner and manager.	12	Springfield.
Agawam, Elm Shade Dairy,	S. S. & E. F. Bodurtha, owners and managers.	25	Springfield.
Amherst, H. M. Thompson's farm,	H. M. Thompson, owner and manager.	25	Holyoke.
Amherst, U. G. Groff's farm,	U. G. Groff, owner and manager.	34	Amherst.
Andover, Arden Farm,	Wm. M. Wood, owner; J. M. Putnam, superintendent; Austin C. Huggins, manager of creamery.	55	Andover, Lawrence, Woburn and Boston.
Andover, Shattuck Farms,	F. Shattuck, owner and manager.	50	Lawrence.
Arlington, L. M. Dolloff's farm,	L. M. Dolloff, owner and manager.	8	Arlington.

List of Massachusetts Farms making Milk of Superior Quality and Cleanliness and selling their Product higher than the Regular Market Price — Continued.

LOCATION, FARM.	Owner and Manager.	Approximate Number of Cows.	Where marketed.
Ashland, H. W. Chadbourne's farm,	H. W. Chadbourne, owner and manager.	37	Brookline, Newton and Boston.
Auburn, Wellswood Farm, . . .	George O. Keep, owner and manager.	30	Worcester.
Barnstable, Bay Farm,	H. C. Everett, owner and manager.	-	Barnstable.
Barre, Highland View Farm, . . .	D. A. Howe, owner; W. E. Howe, manager.	25	Worcester.
Beverly, Bull Rush Farm,	George R. Wales, owner and manager.	26	Beverly.
Beverly, Cherry Hill Farm, . . .	H. P. Hood & Sons, . . .	156	Brookline and Boston.
Bolton, Wataquodock Farm, . . .	Paul Cunningham, owner and manager.	35	Boston and vicinity, by Alden Brothers Company.
Braintree, F. H. Sanford's farm, .	F. H. Sanford, owner and manager.	20	Braintree.
Brimfield, Clarence B. Brown's farm.	Clarence B. Brown, owner and manager.	21	West Warren.
Brockton (Montello Station), Dutchland Farm.	Fred F. Field, owner; Earl D. Upton, manager.	70	Brockton.
Brookline, Louis Cabot estate, . .	Louis Cabot, owner; R. Barkhouse, manager.	10	Brookline.
Charles River, Needham, Walker-Gordon Farm.	Walker-Gordon Laboratory Company, owner; John Nichols, manager.	100	Boston and vicinity.
Chilmark (West Tisbury P. O.), Oakview Farm.	J. F. Adams, owner and manager.	17	Vineyard Haven and Edgartown.
Concord, Middlesex School Farm, .	Middlesex School, . . .	40	Concord.
Concord, Alfred Curtis farm, . . .	Alfred Curtis, owner and manager.	25	Concord.
Concord, Jens Michelson farm, . .	Jens Michelson, owner and manager.	20	Concord.
Dighton, Rock Farm,	J. W. Earle, owner; Ralph Earle, manager.	15	Fall River.
Dorchester, Codman Farm,	Watson B. Fearing, owner and manager.	158	Boston.
East Lexington, Geo. C. Hatch farm,	George C. Hatch, owner and manager.	20	Arlington and Lexington.
East Lexington, Chester Lawrence farm.	Chester Lawrence, owner and manager.	10	Arlington and Lexington.
East Longmeadow, Peter Kronvall farm.	Mrs. Peter Kronvall, manager.	8	Springfield.
East Lynn,	J. D. Coombs, lessee and manager.	3	East Lynn.
East Walpole,	Geo. A. Plympton, owner; Eben Voorhees, manager.	100	Boston and vicinity, by Elm Farm Milk Company.
Everett, Joseph H. Cannell's farm,	Joseph H. Cannell, owner and manager.	7	Everett.
Everett, Thomas F. Leavitt's farm,	Thomas F. Leavitt, owner and manager.	8	Everett.
Fairhaven, Dana Farm,	Elisa N. and Edith Dana, owners and managers.	52	Fairhaven, Marion and Mattapoisett (in summer).
Fairhaven, Lewis F. Blossom's farm,	Lewis F. Blossom, owner and manager.	12	Fairhaven.
Framingham, Millwood Farm, . . .	Mrs. E. F. Bowditch, owner; J. P. Bowditch, manager; F. E. Barrett, superintendent.	300	Boston and Welleley.
Framingham, Waveney Farm, . . .	Reginald W. Bird, owner; A. E. White, manager.	50	Boston, by Alden Brothers Company.
Framingham, Cherry Meadow Farm.	D. M. and E. F. Belohes, owners; E. F. Belohes, manager.	35	Framingham.

List of Massachusetts Farms making Milk of Superior Quality and Cleanliness and selling their Product higher than the Regular Market Price — Continued.

LOCATION, FARM.	Owner and Manager.	Approximate Number of Cows.	Where marketed.
Franklin, Ray Farm, . . .	E. K. Ray estate, owner; Joseph G. Ray, trustee and manager.	100	Boston, by Elm Farm Milk Company.
Gardner, Lakeside Farm, . . .	J. Henry Ware, owner and manager.	7	Gardner.
Gardner, Rockland Farm, . . .	Willis E. Knight, owner and manager.	25	Gardner.
Gardner, Otto Wickman's farm, . .	Otto Wickman, owner and manager.	5	Gardner.
Gloucester, Howard P. Lane's farm,	Howard P. Lane, owner and manager.	50	Gloucester.
Gloucester, H. Wallace Lane's farm,	H. Wallace Lane, owner and manager.	30	Gloucester.
Gloucester, Peter Hagstrom's farm,	Peter Hagstrom, owner and manager.	5	Gloucester.
Granby, C. W. Ball's farm, . . .	C. W. Ball, owner and manager.	29	Holyoke.
Great Barrington, Lone Pine Farm,	W. B. Nisbet, owner; Michael Conden, manager.	20	Great Barrington.
Greenfield, Wayside Farm, . . .	Frank H. Reed, owner; Mr. Purrington, manager.	25	Greenfield.
Groton, G. W. Greenhalge's farm, .	G. W. Greenhalge, owner and manager.	25	Boston and vicinity, by D. Whiting & Sons.
Hamilton, Miles River Farm, . .	Maxwell Norman, owner and manager; C. E. Johnson, superintendent.	75	Boston.
Hardwick, Louis H. Ruggles' farm,	Louis H. Ruggles, owner and manager.	60	Boston.
Hardwick, Mixer Farm, . . .	Mary A. Mixer, owner; Dr. Samuel J. Mixer, manager; J. S. Clark, superintendent.	200	Boston.
Haverhill (Bradford District), J. B. Sawyer's farm.	J. B. Sawyer, owner and manager.	-	Haverhill.
Haverhill, North Broadway Milk Farm.	E. A. Emerson, owner and manager.	40	Haverhill.
Haverhill (P. O. East Haverhill), Fred Kimball's farm.	Fred Kimball, owner; Leonard Kimball, manager.	50	Haverhill.
Holyoke, Whiting Farm, . . .	W. F. Whiting, owner; John F. Richardson, manager.	20	Holyoke.
Ipswich, Albert Elwell's farm, . .	Albert Elwell, owner and manager.	19	Ipswich and Essex.
Ipswich, Upland Farm, . . .	F. P. Frasier & Son, owner; Benj. F. Barnes, manager.	100	Boston, Manchester, Magnolia, Beverly and Beverly Farms.
Kingston, Miss Helen Holmes' farm,	Miss Helen Holmes, owner and manager.	20	Kingston.
Lee, John Goodrich's farm, . . .	John Goodrich, owner and manager.	40	Lee.
Leominster, Boutelle Farm, . . .	E. H. Boutelle, owner and manager.	30	Leominster.
Leominster, Sholan Farm, . . .	Paul Washburn, owner; A. G. Hollquist, manager.	40	Leominster.
Lexington, H. Swenson's farm, . .	H. Swenson, owner and manager.	40-50	Arlington, Cambridge and Somerville.
Lexington, Kelsey Ranch, . . .	Harry S. Kelsey, owner; S. H. Parks, superintendent.	52	Boston.

List of Massachusetts Farms making Milk of Superior Quality and Cleanliness and selling their Product higher than the Regular Market Price — Continued.

LOCATION, FARM.	Owner and Manager.	Approximate Number of Cows.	Where marketed.
Longmeadow, Hillbrow Farm, .	H. M. Burt, owner and manager.	20	Springfield.
Lowell, Hood Farm, . . .	C. I. Hood, owner; J. E. Dodge, manager.	120	Lowell.
Ludlow, E. E. Chapman's farm, .	Edward E. Chapman, owner and manager.	22	Ludlow and Indian Orchard.
Lunenburg, Clover Hill Farm, .	W. J. Fish, owner and manager.	60	Fitchburg.
Lunenburg, Sunnyside Farm, .	George M. Proctor, owner; Fred A. Miller, manager.	48	Fitchburg.
Lynnfield, N. F. McCarthy's farm,	N. F. McCarthy, owner; Eben Holmes, manager.	30	Wakefield.
Marlborough, Fairview Farm, .	Elmer D. Howe & Son, owners and managers.	10	Marlborough.
Medford, Hillside Farm, 20 Gow Street.	Alberton Harris, owner and manager.	10	Medford.
Medford, Mystic Valley Farm, 75 Arlington Street.	John J. Mulkerin, owner and manager.	16	Medford and Arlington.
Methuen, Bragdon Farms, . . .	E. L. Bragdon, owner and manager.	30	Lawrence.
Methuen, Cox Farms, . . .	Louis Cox, owner; L. Coburn, manager.	31	Lawrence.
Methuen, Howe Farm, . . .	E. D. Taylor, owner and manager.	50	Lawrence.
Methuen, Spring Valley Farms, .	Fred Miller, owner and manager.	50	Lawrence.
Methuen, S. W. Williams' farm, .	S. W. Williams, owner and manager.	30	Lawrence.
Millis, Lowland Farm, . . .	E. F. Richardson, owner and manager.	25	Boston.
Milton, Highland Farm, . . .	Patriquin & Newton, lessees; George Patriquin, manager.	65	Milton.
Needham, K. E. Webb's farm, .	Kenneth E. Webb, owner and manager.	31	Needham.
Newton, Greenwood Farm, . . .	M. Barry, owner and manager.	30	Brookline and Newton.
Newton (P. O. Waban), W. B. McMullin's farm.	William B. McMullin, owner and manager.	17	Needham and Newton.
Newtonville, Willow Farm, 120 Farwell Street.	D. F. Smith, owner and manager.	60	Newton, Brookline and Boston.
Norfolk, Meadowside Farm, . . .	T. D. Cook & Co., owners and managers.	35	Boston.
North Amherst, The Elms, . . .	R. D. Dickinson, owner and manager.	30	Amherst.
North Amherst, E. C. Harlow's farm,	E. C. Harlow, . . .	35	-
Northampton, W. J. LaFleur's farm,	W. J. LaFleur, owner and manager.	14	Northampton.
Northampton (Florence), Strawberry Hill Farm.	Mrs. E. K. Learned, owner; Wilfred H. Learned, manager.	12	Northampton.
North Attleborough, Halliday Farm,	Fred F. Halliday, owner; Robert C. Halliday, manager.	9	Pawtucket, R. I.
North Brookfield, Blanchard Farm,	O. W. Means, owner and manager.	20-30	Springfield.
North Falmouth, Manuel G. White's farm.	Manuel G. White, owner and manager.	6	North Falmouth.
North Grafton, Bonnybrook Farm,	Everett N. Kearney, owner and manager.	60	Worcester.
North Tewksbury, Mountjoy, .	Miss Florence Nesmith, owner; C. E. Lougee, manager.	50	North Tewksbury.
North Tewksbury, Hood Farm, .	C. I. Hood, owner; J. E. Dodge, manager.	135	Lowell.

List of Massachusetts Farms making Milk of Superior Quality and Cleanliness and selling their Product higher than the Regular Market Price — Continued.

LOCATION, FARM.	Owner and Manager.	Approximate Number of Cows.	Where marketed.
North Reading, H. A. Upton's farm,	H. A. Upton, owner and manager.	12	Peabody.
North Reading, Maple Leaf Farm,	W. P. Turner, owner and manager.	27	Everett.
Oak Bluffs, Woodsedge Farm,	F. W. Chase, owner and manager.	20	Oak Bluffs.
Paxton, E. G. Richards' farm,	E. G. Richards, owner and manager.	40	Worcester, by C. Brigham Company.
Paxton, Echo Farm,	W. J. Woods, owner; Joseph Graham, manager.	40	Worcester, by C. Brigham Company.
Pepperell, George Shattuck's farm,	George Shattuck, owner and manager.	75	Boston and vicinity, by D. Whiting & Sons.
Pittsfield, Abby Lodge,	A. W. Cooley, owner; Mr. Carlson, manager.	35	Boston.
Pittsfield, Mr. Bardwell's farm,	Mr. Bardwell, owner and manager.	14	Pittsfield.
Pittsfield, E. W. Page's farm,	E. W. Page, owner and manager.	8	Pittsfield.
Pittsfield, Sampson Farm,	Mrs. Charles Wilson, owner and manager.	24	Pittsfield.
Reading, Hillcrest Farm,	Lawrence B. Lewis, owner; Wm. Shaw, manager.	40	Malden.
Revere, Mrs. M. L. Mahoney's farm,	Mrs. M. L. Mahoney, owner; J. J. Mahoney, manager.	25	Malden.
Saugus, Oaklandvale Farm,	Frank P. Bennett, owner and manager.	112	Lynn.
Southborough, Deerfoot Farm,	Robert M. Burnett, owner,	150	Boston, Brookline and Cambridge.
South-Hadley, Joseph A. Skinner's farm.	Joseph A. Skinner, owner and manager.	16	Holyoke.
South Hadley, Frank H. Metcalf's farm.	Frank H. Metcalf, owner; E. W. Turner, manager.	30	Holyoke.
South Hadley, H. B. Lang's farm,	H. B. Lang, owner and manager.	36	Holyoke.
South Hadley, John E. Lyman's farm.	John E. Lyman, owner and manager.	14	Holyoke.
South Hadley, James H. Jones' farm.	James H. Jones, owner and manager.	-	-
South Lincoln, South Lincoln Dairy Company.	South Lincoln Dairy Company, owner; W. A. Blodgett, manager.	175	Boston, Cambridge and Brookline.
South Natick, Carver Hill Farm,	Carver Hill Farms, Inc., owners; Austin Potter, manager.	75	Wellesley, Boston, Natick, Needham, Brookline and Dover.
Southville, Waumesit Farm,	R. F. Parker, owner and manager.	20	Boston and vicinity, by C. Brigham Company.
Sherborn, H. N. Brown's farm,	H. N. Brown, owner and manager.	40	Boston.
Sherborn, Dexter Farm,	George T. Dexter, owner and manager.	23	Boston and vicinity, by Alden Brothers Company.
Sherborn, J. M. Merriam's farm,	J. M. Merriam, owner and manager.	40	Boston.
South Franklin, Ellersie Farm,	Oscar Swanson, owner; R. A. Measerli, manager.	75	Rhode Island and Boston.
Sterling, Twin Oaks Farm (P. O. Pratt's Junction).	James F. Pratt, owner and manager.	100	Milk, Boston, by Alden Brothers Company; cream, Worcester.
Stoneham Valley Farm,	John P. Hylan, owner and manager.	11-12	Stoneham.

List of Massachusetts Farms making Milk of Superior Quality and Cleanliness and selling their Product higher than the Regular Market Price — Concluded.

LOCATION, FARM.	Owner and Manager.	Approximate Number of Cows.	Where marketed.
Stoughton, Tobey Farm, . . .	E. B. Hutchins, owner and manager.	15	Brockton.
Swansea, Meadow Spring Farm, . . .	Jas. H. Gildard, owner and manager.	8	Fall River.
Taunton, George Soper's farm, . . .	George Soper, owner and manager.	30	Taunton.
Templeton, Dolbear Hill Farm, . . .	Harvey O. Winch, owner and manager.	25	Gardner.
Waltham, Pleasantdale Farm, . . .	C. U. Hubbard, owner and manager.	35	Weston.
Warren, Maple Farm,	J. R. Blair, owner and manager.	27	Boston, by C. Brigham Company.
Wayland, Perkins' Estate,	S. N. Sanders, manager, .	12	Waltham.
Westfield, Woronoak Farm,	Edgar L. Gillett, owner; N. J. Weidhaas, manager.	55	Westfield.
Weston, Charles Merriam's farm, . .	Charles Merriam, owner and manager.	51	Waltham.
Weston, Ferndale,	Frank H. Pop, owner and manager.	70	Weston and Newton.
Westwood, Fox Hill Farm,	Joshua Crane, owner; L. W. Jackman, manager.	132	Boston.
West Newton and Barre, Wauwinet Farm.	George H. Ellis, owner; P. F. Staples and R. M. Handy, managers.	400	Boston, Brookline and Newton.
Woburn, John Day's farm,	John Day, owner and manager.	18	Winchester.
Worcester, Pleasant View Farm, . .	Warren C. Jewett, owner and manager.	40	Worcester.
Worcester, Lewis J. Kendall's farm,	Lewis J. Kendall, owner and manager.	40	Worcester.
Worcester, Intervale Farm,	J. Lewis Ellsworth, owner and manager.	14	Worcester.
Worcester, Village Farm,	H. B. Prentice, owner and manager.	30	Worcester.

NOTE. — Deerfoot Farms Dairy, office at 172 Tremont Street, wholesale distributing house at 132 Central Street, Boston, milk received from milk depots at Southborough and Northborough, sells milk of superior quality and cleanliness at a price above that of ordinary market milk, and handles the product of 129 dairy farms, averaging about 10 cows each, located in Southborough, Northborough, Westborough and Holliston. Most of these farms, therefore, at some time during the year come properly within the requirements of this list.

List of Massachusetts Dairy Farms making Certified Milk.

NAME, LOCATION.	Owner and Manager.	Certified by —	Ap- prox- imate Num- ber of Cows.	Where marketed.
Birchfield Farm, South Dartmouth.	Lawrence Grinnell, owner and man- ager.	Medical Milk Commission of New Bedford.	24	New Bedford.
Cedar Crest Farm, Wal- tham.	John C. Runkle, owner; Louis W. Dean, manager.	Medical Milk Commission of Cambridge.	90	North Shore, Cambridge and Boston.
Cedar Hill Farm, Waltham,	Miss Cornelia War- ren, owner; Charles Cahill, manager.	Medical Commis- sion of Cam- bridge.	124	Waltham, Cam- bridge and Boston.
Cherry Hill Farm, Beverly,	H. P. Hood & Sons, owners; O. H. Perrin, manager.	Medical Milk Commission of Boston.	300	Boston, North Shore and Lawrence.
A. D. Davis' farm, Shef- field.	A. D. Davis, owner and manager.	-	60	Some in Great Barrington; balance out- side of State.
Gilbert Farms, Brookfield,	A. W. Gilbert, owner and manager.	Medical Milk Commission of Springfield.	20-25	Springfield.
Indian Bridge Farm, Way- land.	Edmund H. Sears, owner; Walter Jauncey, Jr., man- ager.	Medical Milk Commission of Cambridge.	16	Waltham.
Ledyard Farm, Andover,	J. A. & W. H. Gould, owners and man- agers.	Medical Milk Commission of Malden.	50	Malden, Mel- rose, Wake- field and Ev- erett.
Massachusetts Agricultural College Farm, Amherst,	Massachusetts Agri- cultural College, J. A. Foord.	Medical Milk Commission of Boston.	65	Boston.
Oaks Farm, Cohasset,	C. W. Barron, owner; W. S. Kerr, manager.	Medical Milk Commission of Cohasset.	125	Cohasset, Brook- line and Bos- ton.
Oliver Prescott's farm, Dartmouth (P. O. North Dartmouth).	Oliver Prescott, owner; Harry W. Martin, manager.	Medical Milk Commission of New Bedford.	25	New Bedford.
Prospect Hill Farm, Essex,	J. A. & W. H. Gould, owners and man- agers.	Medical Milk Commission of Boston.	175	Boston, Brook- line, Jamaica Plain and North Shore.
Seven Gates Farm, North Tisbury.	W. L. Webb, owner; O. L. Curtis, man- ager.	Medical Milk Commission of West Tisbury, Inc.	20-25	Martha's Vine- yard.
Walter A. White's farm, Acushnet.	Walter A. White, owner and man- ager.	Medical Milk Commission of New Bedford.	30	New Bedford.

LIST OF LOCAL MILK INSPECTORS.

Milk Inspectors for Cities and Towns.

Adams,	Dr. A. G. Potter.
Amesbury,	James L. Stewart.
Amherst,	Nelson C. Haskell.
Andover,	Franklin H. Stacey.
Arlington,	L. L. Pierce, D.V.S.
Ashburnham,	James F. Hare.
Ashland,	Ralph W. Bell.
Athol,	John H. Meany, V.S.

Attleboro,	Solomon Fine.
Avon,	R. A. Elliott, M.D.
Barnstable,	George T. Mecarta.
Bedford,	Dr. Immanuel Pfeiffer.
Bellingham,	Dr. Norman P. Quint, West Medway.
Belmont,	Thomas F. Harris.
Berkley,	Alton A. Haskell.
Bernardston,	G. P. Morton.
Beverly,	Henry E. Dodge, 2d.
Billerica,	Albert H. Jones.
Boston,	Professor James O. Jordan.
Braintree,	F. Herbert Gile, M.D.
Bridgewater,	Joseph Brennan.
Brimfield,	J. Walter Brown.
Brockton,	George E. Bolling.
Brookline,	W. E. Ward.
Cambridge,	William A. Noonan, M.D.
Canton,	H. E. Berger, Jr., Wellesley Hills.
Carlisle,	Benjamin F. Blaisdell.
Charlemont,	Charles E. Graves.
Chelsea,	Dr. W. S. Walkley.
Chicopee,	C. J. O'Brien.
Clarksburg,	Cassius Quackenbush, North Adams.
Clinton,	Gilman L. Chase, M.D.
Cohasset,	Darius W. Gilbert, V.S.
Colrain,	Earl W. Goodell, P. O., Bardwell's Ferry.
Concord,	Harry E. Tuttle.
Conway,	A. J. Patterson.
Dalton,	H. Ward Ford.
Dana,	Chas. W. Robertson, M.D., North Dana.
Danvers,	Wm. Hugo Nappe.
Dedham,	Edmand Knobel.
East Douglas,	Frank E. Correll.
Easthampton,	George L. McEvoy.
East Longmeadow,	Henry S. Ashley.
Everett,	E. Clarence Colby.
Fairhaven,	Andrew N. Bruckshaw, M.D.
Fall River,	Henry Boisseau.
Fitchburg,	John F. Bresnahan.
Framingham,	Fred S. Dodson.
Franklin,	J. Newton Blanchard.
Gardner,	Harry O. Knight.
Gill,	George L. Marshall.
Gloucester,	Dr. G. E. Watson.
Gosnold,	John T. Cornell, Cuttyhunk.
Great Barrington,	Dewitt Smith.

Greenfield,	George P. Moore.
Groton,	Herbert Rockwood.
Hadley,	Henry S. Shipman.
Hamilton,	Dr. C. S. Moore. ¹
Haverhill,	Dr. Homer L. Conner.
Hingham,	Quincy Bicknell.
Hinsdale,	Alfred N. Warren.
Holyoke,	Daniel P. Hartnett.
Housatonic,	J. J. Barr.
Hudson,	William H. Clark.
Hull,	Carroll A. Cleverly.
Lancaster,	George E. Howe.
Lawrence,	Dr. J. H. Tobin.
Lenox,	Joseph J. Kirby.
Leominster,	William H. Dodge.
Lexington,	L. L. Pierce, D.V.S., Arlington.
Littleton,	N. B. Conant.
Lowell,	Melvin F. Master.
Ludlow,	A. L. Bennett, D.V.S.
Lunenburg,	Dr. Charles E. Woods.
Lynn,	George A. Flanagan.
Lynnfield,	Franklin W. Freeman.
Malden,	J. A. Sanford.
Mansfield, ²	-
Marblehead,	Andrew M. Stone.
Marlborough,	John J. Cassidy.
Marion,	Chester A. Vose.
Medford,	Winslow Joyce.
Medway,	Norman P. Quint, West Medway.
Melrose,	H. E. Berger, Jr., Wellesley Hills.
Middleborough,	Dr. F. A. Robinson.
Milton,	Wallace C. Tucker.
Millbury,	Fred A. Watkins.
Monson,	Dr. E. W. Capen.
Montague,	Frank Dubie, Turners Falls.
Nahant,	Robert L. Cochrane.
Natick,	Thomas A. Doyle, D.V.M.
Needham,	H. E. Berger, Jr., Wellesley Hills.
New Bedford,	Herbert Hamilton, D.V.S.
Newburyport,	Dr. R. D. Hamilton.
Newton,	Arthur Hudson.
North Adams,	C. T. Quackenbush.
Northampton,	George R. Turner.
North Attleborough,	Hugh Gaw, D.V.S.
Northborough,	Everett C. Valentine.

¹ Inspector of dairies.² Milk samples taken to Attleboro for inspection.

North Brookfield,	Dr. Windsor R. Smith.
North Dana,	Chas. W. Robertson, M.D.
Northfield,	E. C. Field, Northfield Farms.
North Reading,	J. H. Spear.
Norton,	Edmund H. Elliot, Chartley.
Oxford,	Richard C. Taft.
Palmer,	M. H. Davitt, V.S.
Paxton,	H. S. Robinson.
Peabody,	Edward F. McHugh.
Pelham,	Charles H. Jones.
Pepperell,	Dr. Fred A. Davis, East Pepperell.
Pittsfield,	Dr. Bernard M. Collins.
Plainville,	John C. Eiden.
Plymouth,	Walton E. Briggs.
Provincetown,	Antone Dennis.
Quincy,	Daniel Scouler, Jr.
Reading,	Carl M. Smith.
Revere,	Joseph E. Lamb, M.D.
Rutland,	Lewis Drury.
Salem,	John J. McGrath.
Salisbury,	John F. Pike.
Sandwich,	J. E. Holway.
Saugus,	A. W. Sawyer.
Scituate,	George T. Otis.
Shelburne,	G. J. Tower, Shelburne Falls.
Shirley,	John H. Riley.
Shrewsbury,	C. I. Rich.
Somerville,	Herbert E. Bowman.
South Hadley,	George F. Boudreau.
Southborough,	Dr. John W. Robinson.
Southbridge,	Albert R. Brown.
Springfield,	Stephen C. Downs, Fred L. Robertson.
Sterling,	Arthur S. Wilder, Sterling Junction.
Stoneham,	Lawrence E. Doucett.
Stoughton,	William E. Ferrin.
Stow,	Fred E. Whitcomb.
Sutton,	Charles A. Hough.
Swampscott,	Clarence W. Horton.
Taunton,	Lewis I. Tucker.
Tisbury,	Charles S. Norton, Vineyard Haven.
Topsfield,	Charles S. Moore, Danvers.
Wakefield,	Carl M. Smith, Reading.
Waltham,	Charles M. Hennelly.
Ware,	Fred E. Marsh.
Wareham,	John J. Beaton.
Warren,	Joseph St. George.

Warwick,	Charles E. Stone.
Watertown,	E. B. Johnson.
Wellesley,	H. E. Berger, Jr.
Wendell,	Chas. A. Fiske.
Wenham,	C. W. Patch.
Westborough,	Charles H. Reed.
West Boylston,	Dr. A. M. Tyler.
Westfield,	William H. Porter.
Westport,	George A. Tripp.
Weston,	H. E. Berger, Jr., Wellesley Hills.
West Springfield,	J. A. Morrill.
Weymouth,	George B. Bayley, South Weymouth.
Whitman,	E. A. Dyer.
Williamstown,	G. S. Jordan, V.S.
Winchendon,	Dr. G. W. Stanbridge.
Winchester,	Maurice Dinneen.
Winthrop,	S. A. Mowry.
Woburn,	D. F. Callahan.
Worcester,	Gustaf L. Berg.

Each of the following towns has reported that milk inspection is done by its local board of health: —

Sherborn.
Stockbridge.
Sturbridge.

Walpole.
West Brookfield.

The following towns report that the animal inspector of their town inspects the dairies: —

Foxborough.

Sturbridge.

CREAMERIES, MILK DEPOTS, ETC.

Co-operative Creameries.

NUMBER AND LOCATION.	Name.	Superintendent or Manager.
1. Ashfield,	Ashfield Creamery,	William Hunter, manager.
2. Belchertown	Belchertown Creamery,	M. G. Ward, president.
3. Cummington,	Cummington Creamery,	D. C. Morey, superintendent.
4. Easthampton,	Hampton Creamery,	E. B. Clapp, treasurer.
5. Monterey,	Berkshire Hills Creamery,	F. A. Campbell, treasurer.
6. Northfield,	Northfield Creamery,	C. C. Stearns, treasurer.
7. Shelburne,	Shelburne Creamery,	E. P. Andrews, treasurer.

Proprietary Creameries.

NUMBER AND LOCATION.	Name.	Owner or Manager.
1. Amherst,	Amherst Creamery Company, .	R. W. Pease, manager.
2. Amherst,	Fort River Creamery, . . .	Clarence M. Wood, manager (estate of E. A. King, owner).
3. Heath,	Cold Spring Creamery, . . .	L. J. Fontaine, Waltham.
4. Hinsdale,	Hinsdale Creamery,	Walter C. Solomon, proprietor.

Educational.

LOCATION.	Name.	Manager.
Amherst,	Dairy Industry Course, Massachusetts Agricultural College.	W. P. B. Lockwood, professor in charge.

Principal Milk-distributing Depots.

NAME.	Location.	Manager.
Acton Farms Milk Company, .	Somerville, Windsor Street, . . .	Arthur B. Parker, treasurer.
Alden Brothers Company, .	Boston office, 1171 Tremont Street; depot, 24-28 Duncan Street.	Charles L. Alden, President; John Alden, treasurer.
Anderson Brothers,	Worcester, Eckman Street, . . .	Anderson Brothers.
Bonnie Brook Farms, . . .	South Sudbury,	Norman E. Borden.
Mohawk Dairy Company, .	Boston office, 1047 Kimball Building.	Claude E. Davis, treasurer.
Boston Jersey Creamery, .	Boston, 9 Fulton Street, . . .	Theo. P. Grant, president and manager.
Brigham, C., Company, . . .	Cambridge, 158 Massachusetts Avenue.	John K. Whiting.
Brigham, C., Company, . . .	Worcester, 9 Howard Street, . . .	C. Brigham Company.
Bristol Creamery Company, .	Boston, 132 Central Street, . . .	William L. Johnson.
Columbia Creamery,	Springfield, 117 Lyman Street, . .	H. A. Mosely.
Deerfoot Farms Dairy, . . .	Boston, 132 Central Street; depots at Northborough and Southborough.	S. H. Howes.
Elm Farm Milk Company, . .	Boston, Wales Place,	James H. Knapp, treasurer.
Elm Spring Farm,	Waltham, Ellison Road,	G. W. Barrow.
Franklin Creamery Company, .	Boston, 147 Harrison Avenue, . .	Tait Brothers.
Hampden Creamery Company, .	Everett, Orient Avenue,	Frank H. Adams, treasurer.
Hood, H. P., & Sons,	Boston, 494 Rutherford Avenue; branches, 24 Anson Street, Forest Hills; 886 Broadway, Chelsea; 298 Dorchester Avenue, South Boston. Brookline, 136 Westbourne Terrace. Lawrence, 629 Common Street. Lynn, 193 Alley Street. Malden, 425 Main Street. Medford, 452 High Street. Watertown, 479 Pleasant Street.	Charles H. Hood.

Principal Milk-distributing Depots — Concluded.

NAME.	Location.	Manager.
Learned, G. S. (Fitchburg Creamery).	Fitchburg, 26 Cushing Street, .	G. S. Learned.
Llanwhithell Farms Creamery,	Boston, 23 Ferry Street, . .	Nelson P. Cook, manager.
Lyndonville Creamery Association.	Watertown, 86 Elm Street, . .	Willis C. Conner, manager.
Nash, Charles A., . . .	Springfield, 120 Oakland Street, .	Charles A. Nash, manager.
Newhall, J. A., . . .	Newburyport, 32 Monroe Street, .	J. A. Newhall.
Perry, A. D., . . .	Worcester, Kansas Street, . .	A. D. Perry.
Plymouth Creamery Company,	Boston, 268-270 State Street, .	John W. Davies.
Prentice, H. H., & Co. (Berkshire Creamery).	Pittsfield, Crane Avenue, . .	H. H. Prentice.
Rockingham Milk Company, .	Charlestown, Boston office, Hancock Square; depot 330 Rutherford Avenue.	Rolan H. Toothaker, president.
Somers Creamery Company, .	Springfield, 178 Dwight Street, .	W. M. Cushman.
Springfield Creamery, . .	Springfield, Main Street, . .	F. B. Allen, proprietor.
Tait Brothers, . . .	Springfield, 37 Vinton Street, .	Tait Brothers, proprietors.
Turgeon, Frank H., . . .	Boston, 213 Camden Street, . .	Frank H. Turgeon.
Turner Center Dairying Association.	Boston office, 63, 67 and 69 Endicott Street.	Irven L. Smith, manager.
Wachusett Creamery, . .	Worcester, 6 Lincoln Street, . .	E. H. Thayer & Co., proprietors.
Whiting, D., & Sons, . . .	Boston, 570 Rutherford Avenue, .	George Whiting.

Modified Milk Laboratory.

H. P. Hood & Sons, . . .	Boston, 494 Rutherford Avenue, .	C. H. Hood.
Walker-Gordon Laboratory, .	Boston, 1106 Boylston Street, .	George W. Franklin.
D. Whiting & Sons, . . .	Boston, 570 Rutherford Avenue, .	George Whiting.

Receiving Depot for Milk, for Shipments to New Rochelle.

Borden Condensed Milk Company.	West Stockbridge.	
Willow Brook Dairy Company,	Sheffield,	Frank Percy.
Willow Brook Dairy Company,	North Egremont,	George Wyble.

ENCOURAGEMENT OF DAIRYING EXPENSES.

Agents, compensation,	\$294 00
Agents, expenses,	605 72
Total,	\$899 72
Cash prizes,	2,836 38
Total expenditures,	\$3,736 10

REGULAR BUREAU EXPENSES.

The following is a classified statement of the expenses for the year ending November 30, 1916:—

Agents, expenses,	\$1,547 06
Agents, compensation,	2,684 00
Assistants,	17 78
Bureau, expenses,	389 11
Bureau, compensation,	330 00
Samples purchased,	157 28
General agent, traveling expenses,	341 45
Analysts, analyses,	300 50
Analysts, court attendance,	60 00
Photography, lantern slides, etc.,	183 40
Mileage,	360 00
Postage,	100 00
Telephone,	35 65
Printing,	967 21
Supplies,	226 56
Bacteriological laboratory,	300 00
Total,	<hr/> \$8,000 00

P. M. HARWOOD,
General Agent.

Accepted and adopted as the report of the Dairy Bureau.

OMER E. BRADWAY.
GEORGE W. TRULL.
GEORGE E. TAYLOR, JR.

REPORT
ON THE
ENCOURAGEMENT OF DAIRYING CONTESTS,
1916.

ENCOURAGEMENT OF DAIRYING PRIZE CONTESTS, 1916.

P. M. HARWOOD, GENERAL AGENT, DAIRY BUREAU.

PRIZES OFFERED.

The Commonwealth of Massachusetts has placed at the disposal of the State Board of Agriculture a sum not exceeding \$5,000 annually for three years to be expended in the encouragement of practical dairying and the production of milk and dairy products of superior cleanliness, and in developing the live stock industry of the State.

Massachusetts has an enviable reputation as regards the character of her milk supply. It is the purpose of the State Board of Agriculture to do all that it can to maintain and improve the character of the milk produced and offered for sale in this Commonwealth. Realizing the importance of "clean milking" as the basic factor in producing clean milk, and to encourage farmers to become more proficient in this work, the Board through its Dairy Bureau offered prizes aggregating \$2,700 for 1916, as follows: —

(a) *Owners. Competition open to Practical Dairymen.*

For superior merit, \$1,000 divided, no competitor to receive more than \$40.

For merit, \$500 divided, no competitor to receive more than \$20.

For honorable mention, certificate.

For best single result, special sweepstakes certificate.

(b) *Juniors. Competition open to the Boys and Girls, under Eighteen Years of Age, on Farms Eligible in (a).*

For superior merit, \$400 divided, no competitor to receive more than \$20.

For merit, \$200 divided, no competitor to receive more than \$10.

For honorable mention, certificate.

For best single result, special sweepstakes certificate.

(c) *Employees. Competition open to Employees, Men and Women, over Eighteen Years of Age, who do the Milking on Farms Eligible in (a).*

For superior merit, \$400 divided, no competitor to receive more than \$20.

For merit, \$200 divided, no competitor to receive more than \$10.

For honorable mention, certificate.

For best single result, special sweepstakes certificate.

In addition to each cash prize in the above classes a certificate of award will be given to each individual winner.

In response to the above, 653 entries were made and 578 actually competed.

In (a), owners, 374 competed and the following awards were made: —

(a) *Owners.*

Superior merit: —

Edwin H. Alderman, Middlefield.

Lars Anderson, Holden.

Fred L. Batcheller, Sutton.

Beeman Bros., West Brookfield.

John Bergstrom, West Millbury.

Charles A. Bowker, Worcester.

Charles A. Brewster, Salisbury.

Alphonso E. Brown, Lunenburg.

Bryant Bros., Dracut.

Clarence E. Buckley, Northborough.

Ernest W. Burks, Natick.

Joseph W. Clark, West Brookfield.

Joseph Henry Clough, Lowell.

Michael J. Conway, Taunton.

Arthur W. Cutler, West Brookfield.

Herbert A. Day, Warren.

Lorenzo Dean, Boylston.

Samuel Donnelly, East Longmeadow.

Albert Elwell, Ipswich.

C. Bertram Epps, Winchendon.

Wellman J. Fish, Lunenburg.

Fred L. Fisher, Norwood.

Chauncey Gleason, Haverhill.

Bert Green, Ware.

Benjamin B. Green, North Wilbraham.

Mrs. Katie Haas, West Springfield.

Peter Hagstrom, Gloucester.

William A. Hale, Gardner.

Superior merit — *Continued.*

William E. Hartnett, Westminster.
Emil Hendrickson, Templeton.
David F. Henshaw, West Brookfield.
Erick Hermanson, Templeton.
Benjamin Horin, Westminster.
Robert Jackson, Hardwick.
Matthew Jacobson, Boylston.
Lee S. Jenks, Agawam.
Everett N. Kearney, North Grafton.
Charles H. Kelso, Westfield.
John E. Kincare, Newton Center.
John I. King, Provincetown.
Willis E. Knight, Gardner.
Mary Larnard, Amesbury.
Leblanc Bros., Dracut.
Lincoln Bros., Taunton.
Frank H. Linnell, South Hyannis.
Nils J. Lofmark, Sheffield.
Charles E. Lougee, North Tewksbury.
George E. Lowry, Williamstown.
Marchant M. Martin, Southborough.
Edwin B. Mellen, Winchendon.
David H. Mitchell, New Bedford.
Charles H. Morlock, Winchendon.
H. Irving Morlock, Winchendon.
Nadeau Bros., Fitchburg.
John Olson, Raynham Center.
Josiah Q. Packard, Brockton.
George Parker, Sandwich.
Howard A. Parsons, North Amherst.
Per Persson, East Longmeadow.
Enoch E. Peterson, Prescott.
Ida M. Peterson, Agawam.
T. Watson Phelps, Northampton.
William B. Pierce, Taunton.
H. Waters Putnam, Sutton.
Irving W. Putnam, Sutton.
Clayton N. Rhoades, Williamsburg.
George F. Ribero, Franklin.
Justin F. Rice, Barre.
Gustavus A. Rossier, Paxton.
Johann Salstrom, Millbury.
Charles Seyfried, Conway.
Charles H. Shaw, Middleborough.
Thomas Simmons, Ware.

Superior merit — *Concluded.*

Albion G. Smalley, West Boylston.
George E. Southworth, Dana.
Albin Spyut, Ipswich.
H. Arthur Standish, Middleborough.
John Talvitie, Gloucester.
Fred H. Turnbull, Berlin.
Joseph Vaine, Winchendon Springs.
Agostino Visocchi, North Sudbury.
Elmer J. Wade, Taunton.
John B. Walker, Orange.
Manuel G. White, North Falmouth.
George C. Wilkins, Plainville.
Albert L. Woodis, North Brookfield.

Merit: —

John H. Ahola, Gloucester.
Leonard Anzivino, Brookline.
Henry S. Ashley, East Longmeadow.
William H. Atkins, Amherst.
Merton R. Bennett, Ludlow.
Felix Bobard, Wilbraham.
Fred Bowser, Woburn.
Harry M. Burt, Longmeadow.
Frank E. Buss, Leominster.
William J. Cameron, Ipswich.
Edwin H. Cande, Sheffield.
Harry L. Carpenter, Attleboro.
George A. Chapin, Hampden.
Frank G. Clark, Montgomery.
George B. Clark, Concord.
Laurens Clark, Montgomery.
Serenio S. Clark, Williamsburg.
Bert A. Cluff, Dracut.
Frank A. Cottrell, Middlefield.
Charles E. Cutler, Boylston.
Grover N. Dodge, Billerica.
Jacob Dreizen, Taunton.
John Fostini, Taunton.
Everett B. Fox, Dracut.
Leslie B. Gregory, Winchendon.
Hilda Hall, North Wilbraham.
Arthur S. Harris, Fitchburg.
Clifford R. Harris, West Millbury.
Robert Hertel, Fitchburg.
Gordon Hutchins, Concord.

Merit — *Concluded.*

Edwin Ilsley, Newbury.
Carl A. Johnson, East Longmeadow.
Joseph Kasprzak, Monson.
Louis J. Kendall, Worcester.
Ignacy Kobis, Ware.
Mrs. Ida Lehto, Lanesville.
John J. Lemaire, Taunton.
Joseph A. Maille, Dracut.
Louis N. Malhoit, Sutton.
Louis Matson, Millbury.
William R. Michel, East Longmeadow.
Fred Miller, Methuen.
Francis E. Morlock, Winchendon.
Edward M. Nason, Haverhill.
Carl E. Nelson, Gardner.
James A. Noyes, Newbury.
Otto Paaponen, Westminster.
F. J. Pomeroy & Son, Agawam.
Elmer L. Powers, Greenwich.
John Quirk, Ware.
Reid Bros., East Longmeadow.
Renalta Rhomberg, Dracut.
Evan F. Richardson, Millis.
Dell R. Rideout, Raynham.
Frank F. Rosa, Dighton.
Fred Samble, Hampden.
Burt A. Sanborn, Auburn.
Sumner C. Schwartz, Agawam.
Chandler E. Smith, Leominster.
John B. Souza, Taunton.
Sylvester Spellman, East Longmeadow.
Walter Steele & Son, Stoneham.
John C. Summn, Lancaster.
John G. Taylor, Granby.
George H. Timmins, Ware.
Olie A. Tuttle, Hardwick.
Ernest M. Vieweg, Westminster.
Fred L. Warren, Dalton.
Kenneth E. and Vincent O. Webb, Needham.
Mary Abby and Flora White, Heath.
Otto Wickman, Gardner.
Harvey O. Winch, Templeton.
Edgar D. Winslow, Ware.
Ada M. Worsham, Lunenburg.

Honorable mention: —

John Aalto, Westminster.
Jacob Anderson, Gardner.
Lawrence E. Andrews, Essex.
Frank J. Berry, Hardwick.
Charles A. Bigelow, Northborough.
Richard Binnall, Gardner.
Lewis F. Blossom, Fairhaven.
Arthur G. Boynton, Woburn.
James C. Bradway, Monson.
Curtis H. Burdette, Northborough.
John L. Collins, Woburn.
Samuel G. Copeland, West Bridgewater.
John Day, Woburn.
Pardon H. Devoll, New Bedford.
John Fay, Brockton.
Charles W. Felton, Enfield.
Frank F. Ferreira, Falmouth.
John J. Finnegan, Sharon.
George M. Folsom, Taunton.
George H. Gould, Taunton.
Albert L. Hauck, West Brookfield.
Charlie B. Jordan, Holden.
Caroline R. King, Raynham.
Henry E. King, Taunton.
P. John Landers, Belchertown.
Alexander Larson, Hampden.
Ulric F. LeDuc, Chesterfield.
Clinton F. Markham, East Longmeadow.
Elliot B. Markham, East Longmeadow.
Edward N. McGowan, East Templeton.
Oliver W. Means, Brookfield.
Frank Nietupski, Ludlow.
Elbridge Noyes, Newbury.
John Nygard, Templeton.
Benjamin F. Paige, Hanson.
Earle M. Parsons, Northampton.
Eldon H. Price, Lunenburg.
John Quinn, Kingston.
G. Ashley Randall, Belchertown.
John J. Reilly, Agawam.
William Reimers, Monson.
John T. Rogers, East Longmeadow.
William J. Rudkin, Rockland.
Michael Sacks, Leicester.
George A. Smith, Rockland.
Isaac B. Snow, Greenfield.

Honorable mention — *Concluded.*

Clifton B. Walcott, Barre.

Harrison S. Williams, West Springfield.

George W. Crowell, Taunton.

In (b), juniors, 65 competed and the following awards were made: —

(b) *Juniors.*

Superior merit: —

Fred L. Batcheller, Jr., Sutton.

John G. Berry, Hardwick.

Albert N. Brown, Lunenburg.

Percy K. Brown, Lunenburg.

Albert E. Elwell, Ipswich.

Franklin S. Epps, Winchendon.

Clifton B. Green, North Wilbraham.

Isadore Maynard Horin, Westminster.

Robert J. Jackson, Hardwick.

Prentiss R. Jenks, Agawam.

Howard Jordan, Holden.

John E. Kincare, Jr., Newton Center.

Fay B. Montague, Northampton.

Ruth Persson, East Longmeadow.

Maxine A. Rhoades, Williamsburg.

John Talvitie, Jr., Gloucester.

Charles Visocchi, North Sudbury.

Merit: —

Dominic Anzivino, Brookline.

Charles G. Bigelow, Northborough.

Victor M. Cluff, Dracut.

Irving C. Flagg, Westford.

Laurie L. Harris, Fitchburg.

Leonard F. Lemaire, Taunton.

Norman G. Oakes, Clarksburg.

Clifford A. Rideout, Raynham.

Honorable mention: —

Paul Bradford, Acushnet.

Earl Bradway, Monson.

Arnold G. Brewer, New Marlborough.

Ralph M. Brown, Brimfield.

Albert E. Carpenter, Attleboro.

Leo P. Cluff, Dracut.

Samuel A. Cutler, Boylston.

Grace B. Filer, Brimfield.

Honorable mention — *Concluded.*

Walter Kasprzak, Monson.
Walter Larson, Hampden.
Joseph Lesniak, Taunton.
Leon E. McGowan, East Templeton.
Agnes Nietupski, Ludlow.
Ralph A. Price, Lunenburg.
Irvin W. Ribero, Franklin.
Kenneth M. Shaw, Sutton.
Antone P. Silvia, Taunton.
Edward Tenney, Deerfield.
John Wirf, West Brookfield.

In (c), employees, 139 competed and the following awards were made: —

(c) *Employees.***Superior merit: —**

Cecil E. Alderman, Chester.
Victor Anderson, Holden.
Fred Everett Challet, Northampton.
Michael J. Conway, Jr., Taunton.
Herbert R. Cowles, Westfield.
Arthur C. Davis, Sutton.
Joseph S. Davis, Sandwich.
Thomas Ferguson, New Bedford.
Elmer W. Fish, Lunenburg.
Leonard C. Fisher, Norwood.
Joseph A. Foster, Provincetown.
W. P. Gleason, Haverhill.
Stanislaus Lechezainski, Ware.
Daniel N. Morrison, Gardner.
Edward F. Parsons, North Amherst.
Kenneth K. Putnam, Sutton.
Edwin F. Ribero, Franklin.
Hobart E. Rice, Barre.
Clarence A. Rossier, Paxton.
Jeffrey Roy, Leominster.
Fred G. Stone, North Grafton.
Fred Topping, Sheffield.
Arthur A. Turnbull, Berlin.
Edward Vaine, Winchendon Springs.
Joseph Visocchi, North Sudbury.
Leon E. Waltz, Westminster.
William J. Weagle, Ipswich.
Howard R. Whitcomb, Lunenburg.
Merton E. Wilson, West Brookfield.

Merit: —

Joseph E. Berthiaume, West Millbury.
Floyd E. Boyea, East Longmeadow.
Albert B. Cutler, Boylston.
Martin Gogoliski, Newtonville.
Harry Hertel, Fitchburg.
Leonard I. Ilsley, Newbury.
Herbert E. Kendall, Worcester.
Frank H. Lambson, Montgomery.
Manuel Lopez, Falmouth.
Daniel J. Quirk, Ware.
Nicholas J. Samble, Hampden.
Carl F. Schatz, Heath.
Robert A. Sherman, Hyannis.
Henry W. Shook, Sheffield.
Samuel Sirotin, Taunton.
Manuel Souza, Taunton.
Lawrence Stuart, Raynham.
Harry A. Tarbell, Leominster.
Dwight Taylor, Granby.
Elmer Wambolt, Millis.
Theron E. Warren, Dalton.
Everett P. Watson, Needham.
John Wendler, Hampden.
Robert L. West, Ware.
Alton B. Winslow, Ware.
Joseph Woiril, Worcester.

Honorable mention: —

Fred H. Abbott, Northborough.
Chester Cameron, Ipswich.
John T. Cleary, Sharon.
Harry Cowan, Holden.
Mary Danckert, Northborough.
Benjamin H. Davis, Taunton.
Clover Delisle, Raynham.
Arnold C. Dow, Greenfield.
Lewis Elwell, Essex.
Almon D. Flagg, Greenfield.
Maurice Flagg, Westford.
Harold R. Goodnow, Greenfield.
Roland M. Hauck, West Brookfield.
George A. Hughes, Brookfield.
Arthur E. Leary, Rockland.
Austin K. Noyes, Newbury.
George D. Paige, Hanson.

Honorable mention — *Concluded.*

Nelson T. Rogers, East Longmeadow.

Frank E. Rudkin, Rockland.

Harry E. Shepardson, Norwood.

Walter B. Shaw, Sutton.

George Underwood, East Longmeadow.

Fred P. Winch, Templeton.

In (a), owners, a sweepstakes certificate was awarded to William A. Hale of Gardner.

In (b), juniors, a sweepstakes certificate was awarded to Albert N. Brown of Lunenburg.

In (c), employees, a sweepstakes certificate was awarded to Elmer W. Fish of Lunenburg.

ADDITIONAL PRIZES.*Prizes offered to Local Inspectors of Milk.*

Experience has shown that best results come from personal solicitation and direction. These prizes, for meritorious results only, and aggregating \$125, were offered with that end in view.

(a) To local inspectors of milk in cities and towns supplied by more than fifty dairies, and having fifteen or more separate entries in the 1916 clean milk contest, for the greatest number of superior merit cottons the following prizes were offered: —

First prize,	\$25 00
Second prize,	20 00
Third prize,	15 00
Fourth prize,	10 00
Fifth prize,	5 00

The following awards were made: —

First prize, Gustaf L. Berg, Worcester.

Second prize, Stephen C. Downs, Springfield.

Third prize, John F. Bresnahan, Fitchburg.

Fourth prize, Harry O. Knight, Gardner.

Fifth prize, Lewis I. Tucker, Taunton.

(b) To local inspectors of milk in cities and towns supplied by less than fifty dairies, and having five or more separate

entries in the 1916 clean milk contest, for the greatest number of superior merit cottons the following prizes were offered: —

First prize,	\$16 00
Second prize,	12 00
Third prize,	10 00
Fourth prize,	8 00
Fifth prize,	4 00

The following awards were made: —

First prize, G. W. Stanbridge, Winchendon.
 Second prize, Fred E. Marsh, Ware.
 Third prize, George W. Smith, Ipswich.
 Fourth and fifth prizes not awarded.

Similar prizes were offered Massachusetts creameries but without results, except in one instance, namely, Hampton Co-operative Creamery of Easthampton, which was awarded a gratuity of \$20.

Prizes offered to Co-operative Creameries.

Realizing the importance of remunerative outlets for cream in those sections of the State where stock raising requires that the skim milk be kept at home, the Board of Agriculture inaugurated a system of prizes to educate and encourage a better cream product delivered at our creameries. Seven prizes, aggregating \$250, were offered. There were four entries in the contest, and three of the contestants attained meritorious results and were awarded prizes. Ashfield Creamery, Ashfield, scoring 96.09, was awarded first prize; Shelburne Creamery, Shelburne, scoring 91.37, was awarded second prize; and Cummington Creamery, Cummington, scoring 74.20, was awarded third prize.

The judge in the clean milk contest was Dr. Charles E. Marshall, and in the creamery contest, Professor W. P. B. Lockwood, both of Amherst. Our thanks are especially due to these gentlemen who gave their time and efforts free of charge.

THIRD ANNUAL REPORT

ON

BOYS' AND GIRLS' CLUB. WORK.

THIRD ANNUAL REPORT ON BOYS' AND GIRLS' CLUB WORK.

Boys' and Girls' Clubs as a means of interesting young people in agriculture and household arts are nation-wide in their scope. The growth of the work in Massachusetts makes the work of administration more complex from year to year. In former years the work in this State was managed directly from the Agricultural College. During the past year the work in Franklin, Hampden and Worcester counties has been under the immediate direction of the County Farm Bureaus. In each of these counties one member of the staff devoted his time to the Boys' and Girls' Clubs. Plymouth and Hampshire counties have had similar directors during a part of the year. A small district comprising Framingham and adjoining towns has employed a director. In addition to these county agencies, the vocational agricultural departments and the agricultural schools of the State have been active in promoting and supervising the work. One form of local supervision which stands out unique, in a class by itself, is the work of the Plymouth County Trust Company. This institution employs an agricultural adviser, who acts both as a director of Boys' and Girls' Clubs and an adviser to adult farmers. There is close co-ordination between his work and that of the County Farm Bureau. It must be said in this connection, also, that the readiest avenue of approach to the boys and girls is through the public schools. It is due to the sympathetic good will of the school superintendents of the Commonwealth that this important work has reached its present magnitude. The active aid of this body of men and women is essential to the future success of the Boys' and Girls' Clubs.

CLUB ENTERPRISES.

Nine distinct lines of work have been carried on during the past year, — corn growing, potato growing, market gardening, egg production, home economics, canning, home gardening, pork production and calf raising. These are the main activities of an all-round farm home, representing as they do the field, the garden and the household. Table I. shows how these various activities are distributed. It will be noted that every county is represented. The table presents some facts worthy of note. Worcester County leads all the other counties, except in pork production and home gardens; it stands almost alone in calf raising. Worcester County was fortunate in having an expert adviser for this line of work. Other counties were advised not to take up this work till experts could be secured to direct it. Plymouth County stands out as the leader in pork production. This may be accounted for by the fact that the promotion of the pig club was made a special feature of the work of the Plymouth County Trust Company. Middlesex County leads its closest competitor, Essex, by nearly 4,000 in home gardens. It may be further noted that the scale of popularity, as shown by the totals, is in the following order: home gardens, home economics, market gardening, canning, egg production, pork production, potato growing, corn growing and calf raising. This order is likely to fluctuate from year to year; it depends quite as much upon the interest and activity of club directors as upon the interests of the boys and girls themselves.

The study of this table should not be passed without a brief reference to Dukes and Nantucket counties. It is a pleasure to know that they are represented. The numbers, however, are in no sense a measure of the interest of those counties in this great work. Appeals for aid have been coming from those counties ever since the club work started, nine years ago. The children are there. The wellspring of interest is there. Some means should be found whereby those counties may share in the great benefits of this work now enjoyed in nearly all other parts of the Commonwealth.

TABLE I. — *Distribution of the Work by Counties and by Clubs, 1916.*

COUNTIES.	CLUB ENTERPRISES.								Totals.	
	Corn Club.	Potato Club.	Market Gardens Club.	Poultry Club.	Home Economics Club.	Canning Club.	Pig Club.	Calf Club.		Home Gardens Club.
Barnstable, . .	3	16	4	5	13	7	7	-	346	401
Berkshire, . .	2	11	3	1	86	6	10	-	650	769
Bristol, . .	5	16	21	23	53	56	36	-	3,404	3,614
Dukes, . .	-	-	-	1	-	2	-	-	16	19
Essex, . .	3	11	43	40	68	40	34	-	6,017	6,256
Franklin, . .	6	8	21	96	295	4	28	-	1,704	2,162
Hampden, . .	-	84	311	110	227	259	36	4	4,086	5,117
Hampshire, .	27	41	63	42	55	40	55	-	2,390	2,713
Middlesex, .	15	27	103	145	274	296	35	-	9,917	10,812
Nantucket, .	-	-	-	-	1	-	-	-	-	1
Norfolk, . .	16	45	66	159	172	72	51	-	3,450	4,031
Plymouth, .	22	75	100	29	157	79	215	-	4,211	4,888
Suffolk, . .	-	-	-	-	45	10	-	-	1,181	1,236
Worcester, .	73	170	626	382	1,439	330	127	71	3,185	6,403
Totals, . .	172	504	1,361	1,033	2,885	1,201	634	75	40,557	48,422

NOTE. — The above figures are to be considered only as close approximations, as the data from which they were compiled were not always complete.

COMPETITION OF CITIES, TOWNS AND SCHOOLS.

An important feature of the club work is the promotion of competition among cities, towns and schools. These are divided into six classes, — cities, towns of more than 7,500 population, towns of less than 7,500 population, schools of more than eight rooms, schools of two to eight rooms, and rural schools of one or two rooms. The two main reasons for promoting this line of work is for the purpose, first, of enlisting the interest of school superintendents; and second, of inducing local communities to secure paid supervision of the work during the summer. How valid these reasons are will appear from the following list of important cities competing for the large silver cup: Beverly, Brockton, Gloucester, Hol-

yoke, Lowell, Malden, Marlborough, New Bedford, Newburyport, Revere, Salem, Springfield, Taunton and Waltham. All but two of these cities reported that the garden work would be looked after during the summer vacation by paid supervisors and inspectors. This practice ought to be encouraged, and, if possible, extended to all parts of the Commonwealth. It is the surest if not the only means of preventing a lapse of interest in the movement.

Towns. — The towns having a population of more than 7,500, in competition for a silver cup, are as follows: Adams, Arlington, Easthampton, Framingham, Leominster, Methuen, Milton, Natick, Palmer, Ware and West Springfield. All of these towns paid for some supervision during the summer, some of them during a part and others during the entire season.

The towns of less than 7,500 population in the competition are as follows: Abington, Ashfield, Brimfield, Carver, Concord, East Bridgewater, Easton, Erving, Freetown, Hampden, Hanover, Hanson, Hull, Leverett, Marion, Mattapoisett, Middleborough, Norwell, Orange, Pembroke, Plainfield, Plympton, Rockland, Russell, Scituate, Sherborn, Shutesbury, Stoughton, Tolland, Wareham, Wendell, West Bridgewater, Whitman and Wilbraham. Twelve of these thirty-four towns reported their intention of paying for supervision. In addition to the foregoing list, quite a number of towns and cities not in competition for a prize reported the employment of paid supervision. This appears to be the most hopeful feature of the whole enterprise.

Schools. — No schools of more than eight rooms appear to have entered the competition.

Schools of two to eight rooms in the competition are as follows: Carter Street School, Lowell; Tenth Street School, Lowell; Center School, Lunenburg; Roslindale School, Boston; Field Grammar School, Leominster.

Schools of one to two rooms and small clubs are as follows: Trowbridge School, Groton; Moors School, Groton; Center School, Pembroke; Russellville School, Hadley; Roslindale Club, Roslindale; North End Garden Club, Boston; Bay State Road Club, Boston; South Bay Union Roof Garden, Boston; College Club School Garden, Lowell; Belvidere Garden Club, Lowell.

EXHIBITIONS OF PRODUCTS.

Fairs. — This has not been a favorable year for children's exhibitions. Some were omitted on account of the prevalence of infantile paralysis. Nevertheless, most of the societies under the authority of the State Board of Agriculture carried on the Children's and Youths' Department as in past years.

Local Exhibitions. — In addition to the regularly organized societies, nearly sixty local exhibitions were held in various parts of the State. Some of these were under the auspices of the local grange, some under the school, some under the board of trade or other volunteer organizations. From the incomplete data at hand it appears that 6,259 young people exhibited products of the garden and home. The total number of articles displayed was 12,523. The total amount of money paid to the exhibitors in premiums and other awards amounted to \$1,606.11. This manifestation of local interest is a good sign; it is of a piece with the growing tendency to employ paid supervision during the summer. Both are important factors in the administration of the work and should be encouraged and more fully developed.

PRIZE WINNERS OF 1915.

It is impossible to check up all the records and award the prizes before the date set for filing this report. Hence, the awards made, if reported, must be inserted in the report following the year in which the work was done. The following is a list of winners in the various clubs in 1915: —

Home Economics Club.

- | | |
|---------------|---|
| First Prize. | Effie Cahoon, Harwich. |
| Second Prize. | Marion Anthony, Framingham Normal School.
Dorothy Rhoades, Worcester Normal School. |
| Third Prize. | Kenneth Lynch, Lowell.
Gladys Brown, Wellesley.
Anka Doycheff, Campello.
Dorothy Hirst, Fairhaven.
Marion Hurlburt, Orange.
Ruth Loud, North Abington.
Mildred Martin, Ashfield.
Dorothy Miles, Holden.
Ethel Miller, Williamsburg.
Gertrude Peterson, Orange. |

- Third Prize. Madeline Pickett, Brockton.
Edith Plumb, Oakham.
Maxine Rhoades, Williamsburg.
Hermine Schulz, Roslindale.
Dorothy West, Harvard.
Helen Wold, Orange.

Canning and Marketing Club.

- First Prize. Ethel Spooner, Brimfield.
Second Prize. Daniel Harkins, Brockton.
Hermine Schulz, Roslindale.
Third Prize. Harry A. Ball, West Bridgewater.
Andrew C. Rice, Wilbraham.
Gust W. Anderson, Brockton.
Helen Streeter, Cummington.
Blanche Regnier, Cheshire.
Nellie Streeter, Cummington.
Gladys Estabrook, Brimfield.
Mildred Martin, Ashfield.
Ethel B. Smith, Brockton.
Cathleen Galvin, Dorchester.
Cecelia Conlin, Hopkinton.

Market-garden Club.

- First Prize. Gust W. Anderson, Brockton.
Second Prize. Richard W. Arms, Hopkinton.
Harry A. Ball, West Bridgewater.
Edward Caldon, West Springfield.
John E. Devine, Amherst.
Frank J. Kokoski, Amherst.
Roman Swaikowsky, Hadley.
Mary Kelliher, Brockton.
Third Prize. Frank J. Kokoski, Amherst.
Walter R. Carlson, Brockton.
Earl W. Kelton, Orange.
Robert J. Damon, Williamsburg.
Philip C. Landers, Brockton.
Milan A. Logan, Brockton.
Robert Cary, Brockton.
Charles L. Merrick, Wilbraham.
Leslie S. Lockwood, Fitchburg.
Charles A. O'Brien, Brockton.
Florence Chapin, Chicopee Falls.
Inez Bedard, Oxford.
Ethel B. Smith, Brockton.
Maxine Rhoades, Williamsburg.
Agnes Laffan, Atlantic.

Corn Club.

- First Prize. F. Earl Williams, Sunderland.
Second Prize. Bernard Hartnett, North Hadley.
Third Prize. Ralph Walker, Marlborough.
Albert Jacques, Amherst.
John Bishko, North Hadley.
Edward Parsons, North Amherst.
John E. Devine, Amherst.

Potato Club.

- First Prize. Isadore Horin, Westminster.
Second Prize. Lawrence Estes, Windsor.
Sanford Hawley, Hadley.
Andrew C. Rice, Wilbraham.
George Munson, Bisbees, R. D.
Third Prize. Arnold Hale, Lee.
Walter S. Anderson, Southwick.
Ralph Estes, Windsor.
M. F. Killian, Brimfield.
George Pichette, Hadley.
Harold A. Cady, Windsor.
Clarence W. Holway, Holden.
Winthrop H. Howard, South Easton.
Frank A. Homer, Jr., Wilbraham.
John Killian, Brimfield.
Howard M. Estes, Windsor.
Elmer S. Howard, South Easton.

Poultry Club.

- First Prize. J. Harold Merrick, Wilbraham.
Second Prize. Sidney Dorrington, Westfield.
Alfred Fraters, Rehoboth.
Norman E. Hall, Pratts Junction.
Lewis G. Kelley, Marlborough.
John Mastoo, Ludlow.
Rufus Putnam, Rutland.
Alfred Seher, Westfield.
Floyd Small, Berlin.
Ralph Williams, Harwich.
Third Prize. Rufus Eldredge, East Longmeadow.
Sidney Melbourne, East Longmeadow.
Charles Depoyan, Bridgewater.
Charles Albro, Monson.
Roy Mellen, Rutland.
George Shumway, Monson.
Gordon McKay, Taunton.

Third Prize. Norman Whittaker, Saxonville.
Arthur Clark, Eastham.
Stanley DeQuoy, Georgetown.
Ernest Phipps, Holliston.
Forrest Paige, Hardwick.
Franklin G. Woodard, Marlborough.
Murray Graves, Williamsburg.
Edward Graves, Westhampton.

Pig Club.

First Prize. Willard Buckler, Pittsfield.
Second Prize. Edmund Ferranti, West Bridgewater.
Edward Fydenkeve, Amherst.
William Hagan, Barre.
John Howard, West Bridgewater.
Homer Marsh, Dudley.
Walter Miller, Methuen.
John Rand, Wilbraham.
Harry Rice, South Sudbury.
Wilfrid Selkeld, Petersham.
Herbert Tupper, North Wilbraham.
Harold Turner, North Reading.
C. Wilson Walker, Marlborough.
Willard Buckler, Pittsfield.
Pearl Howard, Barre.
Third Prize. Herbert Townsend, Shelburne Falls.
Robert Wells, Cummington.
Dean Eldridge, Amherst.
Harold A. Legare, Petersham.
Merrill E. Flagg, North Orange.
Kenneth Spring, Orange.
Ray Thompson, Barre.
Charles Merrick, Wilbraham.
Arthur Lincoln, Raynham.
Ralph Williams, Harwich.
John Reagan, West Bridgewater.
Myron Gale, Amherst.
John E. Connors, Raynham.
David U. Law, Lynnfield.
Gertrude Cummings, North Sudbury.
Mildred Wood, Merrimac.
Barbara Priest, Middleton.
Gladys Harlow, North Easton.
Mary Devine, Amherst.
Julia Davidson, Auburn.
Merna Van Buskirk, Bellingham.

*Awards made to Cities, Towns and Schools.**Cities: —*

First, Brockton. Score 941.

Second, Lynn. Score 840.

City schools: —

First, Brockton High. Score 1,569.

Second, Waltham North Grammar. Score 1,493.

Towns over 7,500: —

First, Milton. Score 840.

Second, North Attleborough. Score 606.

Towns less than 7,500: —

First, Hadley. Score 1,232.

Second, Groton. Score 879.

Village schools: —

First, Wilbraham. Score 1,273.

Second, North Hadley. Score 1,250.

Possible score in above cases, 2,000.

EXHIBITION AT SPRINGFIELD.

The boys and girls of Massachusetts held an exhibition of products in conjunction with the Eastern States Agricultural and Industrial Exposition at Springfield, Massachusetts, October 13 to 20, 1916. The products were displayed in a building erected and arranged for this purpose. The following extracts from the New England Journal of Education, November 2, 1916, may indicate the general character and significance of that exhibition: —

The exhibits included all the common products of the garden and field, as well as articles of such handiwork as clothing, fancy needlework, cookery, canned goods, photographs of many activities and written stories of individual effort. The long tables covered with corn, potatoes, beans, bread, eggs and the hundred other things, the long line of tastefully made garments, the extensive bank of canned fruits and vegetables, — all made an impressive sight. Its significance is deepened, however, by the reflection that this great exhibit was the outcome of several years of effort in the promotion of this new type of education. Every loaf of bread, every sample of corn or potatoes, every cluster of fruit jars or of canned vegetables, every cackling hen, every squealing pig, was the objective embodiment of an accomplishment, — an accomplishment attained by some one of the many thousands of individuals enjoying the benefits of this sort of education. Every written story exhibited contained a record of some boy's or girl's success.

In addition to this extensive display of products, the 13th of October was devoted to exhibitions of strength, skill and mental ability on the part of the boys and girls themselves.

The program of the day was divided between the physical and the mental. The physical events included such contests as running, jumping, throwing, lifting, chinning, etc. The mental activities consisted of competitive judging and competitive demonstrations. The judging and demonstrating were done by teams from different States or counties. There was also judging among individual competitors for prizes. In this prize-winning battle of boy and girl wits, the contestants passed judgment upon the merits of market gardens, exhibits of corn, potatoes, canned goods, bread, garment work, poultry, pigs and dairy cattle. Each competitor recorded his judgment on a score card, which was checked up and compared with the judgment of some expert in each line. This judging process, wherein the mind of the boy or girl is alive to the good and bad points of an article under inspection, is greatly superior to the mere display of an inert object on exhibition. It is a more vital aspect of this type of education. Another aspect of the work of this memorable day was the competitive demonstrations. In these contests the boys and girls worked in teams and as individuals. They showed how to prepare, sterilize and seal fruits and vegetables for home use, how to plan, cut and sew a garment, how to make bread, how to obtain and care for the various milk products, how to cut up a pig's carcass, how to plan and build various structures of wood, how to handle eggs, how to kill and dress poultry, how to select and care for seed corn, how to select and prepare potatoes for planting, how to cleanse utensils for handling milk, how to tie knots, and, above all, how to talk about the demonstration while it was being made. The demonstrations indicated above are the crowning arch in this type of education. . . . The merit of it all lies in the fact that such common things and such homely activities lend themselves so readily to the methods and purposes of education. The home arts and the outdoor crafts have been in all ages the chief means of preparing the young to participate in the activities of adult life. . . . The boys' and girls' share in the Eastern States Exposition represented an effort to show how this wealth of material may be utilized by the schools for highly educative ends.

Recommendations.

From a survey of the many features of the Boys' and Girls' Club, the following points seem worthy of special note:—

1. Summer supervision should be developed to the greatest possible extent, possibly by means of State or Federal aid.
2. The Children's and Youths' Department of the Agricul-

tural and Horticultural Societies is to be commended and should be continued.

3. The law granting the bounty to the Children's and Youths' Department should be amended so as to permit the society paying premiums in this Department in excess of the \$200 bounty to be reimbursed for the excess; provided, that the *total* reimbursement for all premiums paid to children and adults shall not exceed the amounts now allowed by law.

4. Local exhibitions of products and demonstrations of work should be encouraged.

5. It seems inadvisable to hold two State-wide exhibitions the same year.

6. The work of the Boys' and Girls' Clubs should be broadened so as to include Insect Clubs and Bird Clubs. This might be done by amending the law relative to insect control in such a way as to allow bounties to members of these clubs for gathering insect eggs and cocoons. One town cleared itself of tent caterpillars by paying the children at the rate of one cent for ten nests. The function of the Bird Club would be one of preservation rather than of destruction.

7. The plan of awarding prizes should be so modified that a person who wins a first prize should be required to compete in a different club thereafter, or increase his enterprise by a good margin if he wishes to compete in the same club twice.

FINANCIAL STATEMENT, NOVEMBER 30, 1916.

Appropriation (through Board of Agriculture),	\$2,000 00
Cash prizes,	546 50
Cups, badges, buttons and ribbons,	429 46
Prize trips,	962 99
Printing, judging, storage,	61 12
Overdraft,	07

Respectfully submitted,

W. R. HART,
Specialist in Charge of Boys' and Girls' Club Work.

AMHERST, MASSACHUSETTS, December 4, 1916.

FINANCIAL RETURNS

AND

ANALYSIS OF PREMIUMS AND GRATUITIES

OF THE

INCORPORATED AGRICULTURAL SOCIETIES,

WITH

MEMBERSHIP AND INSTITUTES,

FOR THE YEAR 1916.

FINANCIAL RETURNS OF THE INCORPORATED

SOCIETIES.	When incorporated.	Amount originally raised by Contribution. (R. L. 124, Sects. 1 and 3.)	Amount now held invested as Capital Stock. (R. L. 124, Sects. 3 and 12.)	Assets.		
				Total.	Real Estate.	Notes.
1 Amesbury and Salisbury (Agricultural and Horticultural),	1881	\$1,002 32	¹ \$8,421 69	\$8,497 96	\$7,896 69	-
2 Barnstable County,	1844	1,740 00	² 12,476 88	12,671 97	10,000 00	-
3 Blackstone Valley,	1884	3,000 00	¹ 9,828 15	9,647 17	9,226 15	-
4 Deerfield Valley,	1871	4,084 01	¹ 9,760 00	9,633 28	9,500 00	-
5 Eastern Hampden,	1856	3,000 00	¹ 20,850 00	20,622 90	20,050 00	-
6 Essex,	1818	4,527 20	⁴ 4,400 00	4,708 68	⁴ 3,400 00	-
7 Franklin County,	1850	1,000 00	⁶ 24,825 00	24,940 14	23,825 00	-
8 Hampshire,	1814	3,285 26	¹ 6,125 00	6,125 00	6,075 00	-
9 Hampshire, Franklin and Hampden,	1818	8,141 29	¹ 33,050 00	33,178 52	32,450 00	-
10 Highland,	1859	3,262 00	¹ 3,120 00	3,244 58	3,000 00	-
11 Hillside,	1888	3,113 32	¹ 5,620 50	6,272 67	5,250 50	-
12 Hingham (Agricultural and Horticultural),	1867	17,406 15	⁸ 3,900 00	3,924 88	2,500 00	-
13 Hoosac Valley,	1860	2,006 00	¹ 15,000 00	15,012 50	14,700 00	-
14 Housatonic,	1848	6,335 33	⁸ 29,940 68	29,980 82	29,000 00	-
15 Lenox Horticultural,	1910	2,108 33	¹¹ 2,793 97	3,074 94	-	-
16 Marshfield (Agricultural and Horticultural),	1867	3,755 33	¹ 16,700 00	16,700 00	16,000 00	-
17 Martha's Vineyard,	1859	4,552 17	¹² 4,778 35	5,001 24	2,780 00	\$50 00
18 Massachusetts Horticultural,	1829	525 00	¹⁴ 815,175 10	877,156 07	518,564 63	-
19 Massachusetts Society for Promoting Agriculture, ¹⁵	1792	-	-	-	-	-
20 Middlesex North,	1855	3,000 00	¹⁷ 6,831 77	7,086 85	-	3,216 80
21 Middlesex South,	1854	3,000 00	¹⁸ 15,200 00	15,566 77	15,000 00	-
22 Nantucket,	1856	3,500 00	¹⁹ 3,500 00	3,651 01	3,500 00	-
23 Oxford,	1888	4,400 00	¹¹ 11,625 00	11,641 91	11,000 00	-
24 Plymouth County,	1819	800 00	¹² 2,281 93	2,239 68	-	-
25 Quannapowitt (Association),	1909	1,000 00	¹ 36,727 53	37,013 66	36,127 83	-
26 West Taunton,	1913	100 29	¹¹ 1,708 20	1,795 81	-	-
27 Weymouth (Agricultural and Industrial),	1891	10,270 00	¹⁹ 15,450 00	15,455 85	15,000 00	-
28 Worcester,	1818	7,730 00	³ 103,484 05	103,802 27	90,258 88	-
29 Worcester North (Agricultural and Driving Association),	1913	3,802 63	¹⁹ 48,349 70	50,952 10	47,599 70	-
30 Worcester Northwest (Agricultural and Mechanical Association),	1867	3,400 00	¹⁹ 15,000 00	15,001 09	15,000 00	-
31 Worcester South,	1855	3,127 40	¹ 21,950 00	22,007 64	20,600 00	-
32 Worcester County West,	1851	3,175 00	¹⁹ 9,100 00	9,121 13	8,000 00	200 00
		\$119,924 03	\$1,316,911 80	\$1,386,019 07	\$976,274 38	\$3,466 80

¹ Invested in real estate, crockery, tables, etc.² Invested in real estate, trust fund, crockery, tables, etc.³ Trust funds.⁴ Invested in a mortgage, crockery, tables, etc.⁵ Mortgage.⁶ Invested in real estate and stocks.⁷ And interest.⁸ Invested in real estate, bank funds, crockery, tables, etc.⁹ Invested in real estate, stocks, bank funds, crockery, tables, etc.¹⁰ Stock.

SOCIETIES FOR THE YEAR ENDING NOV. 30, 1916.

ASSETS — <i>Concluded.</i>					LIABILITIES.				
Stocks and Bonds.	Bank Funds.	Crockery, Tables, etc.	Bills due and unpaid.	Cash on Hand.	Total.	Premiums due and unpaid.	Outstanding Bills.	Mortgages.	Notes.
-	-	\$525 00	-	\$76 27	\$2,252 34	-	\$152 34	\$1,500 00	\$800 00
-	* \$1,951 88	525 00	\$30 00	165 09	2,094 34	\$169 60	124 74	-	1,800 00
-	-	100 00	-	321 02	3,792 50	-	92 50	2,500 00	1,200 00
-	-	250 00	148 00	85 28	1,550 00	-	-	-	1,550 00
-	-	800 00	42 50	230 40	7,759 00	-	110 00	5,049 00	2,600 00
\$1,000 00	-	1,000 90	-	303 68	3,600 00	-	-	-	3,600 00
-	-	-	50 00	65 14	6,332 70	-	132 70	1,300 00	4,900 00
-	-	50 00	-	-	3,225 00	-	-	750 00	2,475 00
-	-	600 00	-	123 52	6,500 00	-	-	4,000 00	2,500 00
-	-	120 00	-	124 58	-	-	-	-	-
-	-	370 00	-	652 17	256 77	-	-	-	* 256 77
-	500 00	900 00	-	24 85	-	-	-	-	-
500 00	15 68	300 00	-	12 50	12,412 59	-	749 99	9,000 00	2,662 60
-	2,368 97	425 00	-	40 14	2,846 56	-	50 00	-	10 2,796 56
-	-	425 00	-	280 97	-	-	-	-	-
-	-	700 00	-	-	4,306 50	6 50	13 800 00	-	3,500 00
278,000 00	1,778 35	200 00	8 00	214 89	25 00	-	25 00	-	-
-	-	15,610 47	-	25,980 97	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-
-	3,614 97	-	-	255 08	-	-	-	-	-
-	-	200 00	300 00	66 77	16,491 23	251 25	1,239 98	12,000 00	3,000 00
-	-	-	-	151 01	-	-	-	-	-
-	-	625 00	-	16 91	2,625 00	-	-	2,500 00	125 00
-	2,192 98	39 00	-	7 75	-	-	-	-	-
-	-	600 00	125 00	160 95	19,425 32	-	1,775 32	13,400 00	4,250 00
-	669 04	1,039 16	12 00	75 61	-	-	-	-	-
-	-	450 00	-	5 85	4,305 57	-	645 57	3,500 00	160 00
-	11,286 81	1,988 36	-	318 22	5,000 00	-	-	-	5,000 00
-	750 00	-	2,048 30	554 10	44,287 56	-	1,311 61	9,000 00	33,975 95
-	-	-	-	1 09	8,711 98	-	661 98	3,050 00	-
-	-	1,350 00	35 00	22 64	7,992 38	202 75	-	-	7,789 63
-	400 00	500 00	-	21 12	-	-	-	-	-
\$279,500 00	\$25,528 63	\$68,141 99	\$2,798 80	\$30,308 57	\$160,792 29	\$630 10	\$7,871 68	\$67,549 00	\$84,741 51

¹¹ Invested in bank funds, crockery, tables, etc.

¹² Estimated.

¹³ Invested in real estate, notes, bank funds, crockery, tables, etc.

¹⁴ Invested in real estate, library, stocks, bonds, crockery, tables, etc.

¹⁵ Includes library, \$45,110.47.

¹⁶ Represented on the Board by special enactment, and makes no returns.

¹⁷ Invested in notes and bank funds.

¹⁸ Invested in real estate.

¹⁹ Invested in notes, crockery, tables, etc.

²⁰ Invested in real estate and bank funds.

FINANCIAL RETURNS OF THE INCORPORATED SOCIETIES

SOCIETIES.	RECEIPTS.							
	Total.	Bounty.	Income from Notes and Bank Funds.	Income from Stocks and Bonds.	New Members.	Donations.	Entry Fees.	Gate Receipts.
1 Amesbury and Salisbury (Agricultural and Horticultural),	\$3,571 10	\$896 30	-	-	\$3 00	\$70 00	-	\$1,382 50
2 Barnstable County,	14,555 77	966 50	\$307 27	-	30 00	2,335 00	\$659 20	4,219 75
3 Blackstone Valley,	7,023 71	1,000 00	-	-	33 00	42 00	100 50	2,326 71
4 Deerfield Valley,	2,225 85	908 60	-	-	10 00	-	255 00	76 85
5 Eastern Hampden,	4,534 09	1,000 00	-	-	20 00	25 50	432 00	2,227 60
6 Essex,	6,993 77	940 50	247 18	-	24 00	1,526 00	184 50	1,800 50
7 Franklin County,	16,910 33	1,000 00	-	\$50 00	401 00	49 00	645 00	6,639 00
8 Hampshire,	2,412 13	871 70	-	-	45 00	330 99	103 50	572 00
9 Hampshire, Franklin and Hampden,	17,280 66	1,000 00	-	-	178 50	-	511 50	6,307 25
10 Highland,	1,246 50	929 65	-	-	17 00	-	35 00	207 85
11 Hillside,	2,261 37	1,000 00	-	-	7 00	-	26 00	919 75
12 Hingham (Agricultural and Horticultural),	1,470 20	951 45	27 10	-	105 00	21 35	-	-
13 Hoosac Valley,	6,550 15	709 40	2,287 60	-	-	-	642 75	2,253 30
14 Housatonic,	14,173 94	1,000 00	60	25 00	216 00	1,567 00	5 75	5,001 75
15 Lenox Horticultural,	1,566 00	713 43	99 32	-	282 00	188 00	-	283 25
16 Marshfield (Agricultural and Horticultural),	13,194 54	853 10	4 82	-	120 00	-	1,884 00	4,606 76
17 Martha's Vineyard,	1,524 63	935 32	73 95	-	-	1 70	-	324 26
18 Massachusetts Horticultural,	30,169 69	1,000 00	322 44	12,040 00	340 00	8,408 75	-	3,772 25
19 Massachusetts Society for Promoting Agriculture, ¹	-	-	-	-	-	-	-	-
20 Middlesex North,	1,210 26	800 42	286 84	-	27 00	-	-	-
21 Middlesex South,	5,774 16	1,000 00	-	-	-	159 20	670 25	1,776 50
22 Nantucket,	1,856 42	893 75	-	-	34 00	45 00	75 00	565 04
23 Oxford,	4,710 84	939 75	-	-	20 00	-	627 35	1,911 50
24 Plymouth County,	902 52	624 45	94 72	-	-	183 35	-	-
25 Quannapowitt (Association),	20,925 40	1,000 00	-	-	-	-	527 00	2,788 75
26 West Taunton,	1,174 50	340 80	25 96	-	-	-	9 50	323 56
27 Weymouth (Agricultural and Industrial),	5,373 73	844 80	-	-	10 00	30 90	412 80	3,043 20
28 Worcester,	43,154 01	935 25	482 00	-	95 00	111 81	2,464 65	22,028 60
29 Worcester North (Agricultural and Driving Association),	12,693 81	984 62	-	-	-	154 30	98 90	6,198 20
30 Worcester Northwest (Agricultural and Mechanical Association),	12,074 13	1,000 00	-	-	253 00	95 50	1,880 75	6,590 50
31 Worcester South,	6,794 55	953 25	-	-	13 00	2 70	1,017 30	2,800 05
32 Worcester County West,	6,256 44	911 10	10 00	-	10 00	40 00	327 70	2,558 25
	\$270,965 20	\$27,904 14	\$4,269 80	\$12,115 00	\$2,293 50	\$15,689 05	\$13,565 90	\$92,905 48

¹ Income from mortgage.² Includes grandstand receipts.³ Included in gate receipts.⁴ Includes legacy, \$5; fund, \$1,500; subscription, \$1,775.

FOR THE YEAR ENDING NOV. 30, 1916—*Concluded.*

RECEIPTS— <i>Concluded.</i>			EXPENDITURES.						
Grandstand Receipts.	Concessions and Rentals.	All Other Sources.	Total.	Premiums and Gratuities paid.	New Buildings and Repairs.	Current Running Expenses.	Farmers' Institutes.	Interest.	All Other Expenses.
-	\$463 10	\$356 20	\$3,494 89	\$996 80	\$288 83	\$1,722 55	-	\$81 00	\$405 71
\$1,470 65	1,213 75	3,452 65	14,490 08	1,169 45	2,885 40	7,637 86	\$9 65	81 00	2,707 32
985 50	165 00	2,371 00	7,387 11	1,346 50	260 78	3,070 74	-	130 00	2,459 09
126 75	144 50	19 15	3,286 35	1,745 45	337 44	695 71	4 50	30 00	472 25
185 25	476 75	466 99	4,608 69	1,167 35	324 50	918 84	-	333 50	1,862 50
-	191 50	2,809 59	6,827 11	1,306 75	2,288 90	2,260 07	12 75	148 30	810 34
982 75	1,181 20	5,962 38	16,545 19	3,335 40	5,599 77	5,052 90	10 00	185 81	2,661 31
18 20	80 34	390 40	2,412 19	1,067 50	47 97	-	-	210 30	1,066 42
1,387 25	1,442 75	6,453 41	17,157 14	3,774 75	6,292 25	1,464 10	-	97 46	5,528 58
-	25 50	31 50	1,266 55	961 10	-	315 45	-	-	-
28 05	180 50	100 07	1,791 70	1,077 55	102 25	571 59	-	6 31	34 00
-	257 50	107 80	1,458 64	1,004 92	61 82	171 08	-	-	220 82
357 35	176 80	123 25	6,537 65	737 60	76 02	832 00	9 00	583 50	4,299 53
1,799 75	2,553 00	1,705 09	14,573 32	6,130 75	1,269 81	7,160 16	-	12 60	-
-	-	-	1,514 21	953 25	-	560 96	-	-	-
-	817 56	4,908 30	13,724 39	966 05	700 00	1,388 90	20 00	160 00	10,489 44
-	-	189 40	1,375 30	927 85	-	306 00	-	-	142 45
-	4,286 25	-	23,489 39	8,091 75	506 17	14,891 47	-	-	-
-	-	-	-	-	-	-	-	-	-
-	-	\$ 96 00	1,091 98	840 70	-	207 78	43 50	-	-
94 00	464 69	1,609 52	5,707 39	2,501 15	-	588 33	-	1,576 99	1,040 92
24 50	60 40	153 73	2,408 70	1,086 25	442 80	256 17	-	-	623 48
716 00	184 00	312 24	4,698 93	1,068 75	192 46	1,407 27	-	125 00	1,900 45
-	-	-	857 85	778 85	-	67 00	-	-	12 00
509 75	706 50	15,393 40	20,764 55	1,053 50	401 44	5,171 13	-	351 95	13,786 53
-	18 00	456 68	1,107 42	345 25	249 82	74 20	-	-	438 15
220 50	207 79	608 74	5,376 71	870 80	620 85	3,139 22	-	199 00	546 84
3,334 25	5,279 72	8,422 73	42,335 79	10,456 76	3,015 97	27,556 47	10 00	215 65	1,280 94
-	858 95	4,398 84	11,587 10	1,028 77	1,048 60	105 04	4 00	2,296 15	7,104 54
1,036 50	1,093 35	124 53	12,073 04	1,011 00	1,511 63	7,422 00	-	261 25	1,867 16
524 00	545 00	939 25	7,257 45	4,359 78	-	1,921 73	15 00	269 38	691 56
537 35	697 30	1,164 74	5,385 32	1,691 25	331 18	2,101 21	12 00	1,152 90	546 78
\$14,336 35	\$24,071 40	\$63,127 58	\$263,711 73	\$63,863 58	\$28,856 66	\$99,333 93	\$150 40	\$8,508 05	\$62,999 11

* Represented on the Board by special enactment, and makes no returns.

* Payment on note.

* And notes.

ANALYSIS OF GENERAL PREMIUMS AND GRATUITIES OFFERED, AWARDED

	SOCIETIES.	TOTAL PREMIUMS AND GRATUITIES.		
		Offered.	Awarded.	Paid.
1	Amesbury and Salisbury (Agricultural and Horticultural),	\$1,864 05	\$874 40	\$874 40
2	Barnstable County,	2,305 50	1,171 05	1,015 70
3	Blackstone Valley,	1,909 75	1,104 00	1,055 75
4	Deerfield Valley,	1,260 50	857 45	857 45
5	Eastern Hampden,	1,948 25	960 85	960 85
6	Essex,	2,167 00	1,109 25	1,109 25
7	Franklin County,	3,167 25	1,584 65	1,584 65
8	Hampshire,	2,024 25	906 25	906 25
9	Hampshire, Franklin and Hampden,	2,569 25	2,145 75	2,145 75
10	Highland,	1,009 30	740 40	740 40
11	Hillside,	1,290 00	861 45	861 45
12	Hingham (Agricultural and Horticultural),	1,323 30	828 22	828 22
13	Hoosac Valley,	1,904 75	582 85	582 85
14	Housatonic,	3,666 95	2,609 70	2,609 70
15	Lenox Horticultural,	1,308 00	836 00	836 00
16	Marshfield (Agricultural and Horticultural),	1,456 00	848 35	848 20
17	Martha's Vineyard,	945 40	799 65	799 65
18	Massachusetts Horticultural,	11,138 50	7,750 00	7,750 00
19	Massachusetts Society for Promoting Agriculture, ¹	-	-	-
20	Middlesex North,	1,034 30	679 75	679 75
21	Middlesex South,	2,027 20	1,236 70	965 45
22	Nantucket,	1,396 50	987 75	987 75
23	Oxford,	1,664 45	929 80	929 80
24	Plymouth County,	726 50	723 45	723 45
25	Quannapowitt (Association),	1,338 50	983 25	983 25
26	West Taunton,	375 90	294 75	294 75
27	Weymouth (Agricultural and Industrial),	1,502 25	753 45	723 65
28	Worcester,	11,711 25	7,423 75	7,423 75
29	Worcester North (Agricultural and Driving Association),	2,679 65	977 55	977 55
30	Worcester Northwest (Agricultural and Mechanical Association),	2,215 50	981 00	981 00
31	Worcester South,	2,204 25	1,279 00	946 90
32	Worcester County West,	1,277 30	792 70	792 70
		\$73,411 55	\$44,463 17	\$43,641 27

¹ Represented on the Board by special enactment, and makes no returns.

AND PAID, AND INSTITUTES HELD, IN THE YEAR ENDING NOV. 30, 1916.

FARMS, FARM IMPROVEMENT, ETC.			FARM AND PET STOCK.			FIELD AND GARDEN CROPS.			
Offered.	Awarded.	Paid.	Offered.	Awarded.	Paid.	Offered.	Awarded.	Paid.	
-	-	-	\$1,220 00	\$456 00	\$456 00	-	-	-	1
\$94 00	-	-	1,183 50	453 50	414 75	\$93 00	-	-	2
104 00	\$98 00	\$98 00	1,429 00	726 00	684 75	-	-	-	3
120 00	115 00	115 00	954 00	584 00	584 00	-	-	-	4
237 00	104 00	104 00	1,123 00	486 50	486 50	-	-	-	5
54 00	34 00	34 00	1,189 75	600 00	600 00	186 00	\$6 00	\$6 00	6
101 00	101 00	101 00	2,496 00	1,116 75	1,116 75	-	-	-	7
-	-	-	1,582 00	564 50	564 50	-	-	-	8
215 00	215 00	215 00	1,612 25	1,479 25	1,479 25	-	-	-	9
100 00	90 00	90 00	765 50	538 25	538 25	-	-	-	10
-	-	-	867 00	569 95	569 95	-	-	-	11
-	-	-	350 00	182 12	182 12	34 00	-	-	12
-	-	-	1,371 00	323 00	323 00	-	-	-	13
50 00	-	-	1,855 00	1,398 25	1,398 25	277 00	255 00	255 00	14
100 00	-	-	-	-	-	-	-	-	15
9 00	3 00	3 00	748 50	490 50	459 00	85 50	-	-	16
-	-	-	617 90	481 60	481 60	-	-	-	17
-	-	-	-	-	-	-	-	-	18
110 50	60 25	60 25	334 00	212 25	212 25	-	-	-	19
40 00	13 00	13 00	1,397 00	928 75	677 50	-	-	-	20
123 00	32 00	32 00	743 75	629 25	629 25	162 00	91 00	91 00	21
73 00	40 00	40 00	1,285 50	661 00	661 00	-	-	-	22
28 00	28 00	28 00	452 50	466 75	466 75	15 75	7 00	7 00	23
30 00	23 00	23 00	620 00	263 00	263 00	-	-	-	24
-	-	-	58 25	40 00	40 00	-	-	-	25
-	-	-	1,020 00	513 60	489 60	-	-	-	26
-	-	-	10,462 00	6,463 75	6,463 75	70 00	70 00	70 00	27
-	-	-	2,182 00	664 50	664 50	-	-	-	28
96 00	49 00	49 00	1,626 00	578 00	578 00	-	-	-	29
186 00	115 00	49 00	1,513 50	739 80	654 60	-	-	-	30
107 00	64 00	64 00	877 50	510 50	510 50	-	-	-	31
\$1,977 50	\$1,184 25	\$1,118 25	\$41,886 40	\$23,121 32	\$22,649 37	\$928 25	\$429 00	\$429 00	32

ANALYSIS OF GENERAL PREMIUMS AND GRATUITIES OFFERED, AWARDED AND

SOCIETIES.	FARM AND GARDEN PRODUCTS.			DAIRY PRODUCTS.		
	Offered.	Awarded.	Paid.	Offered.	Awarded.	Paid.
1 Amesbury and Salisbury (Agricultural and Horticultural),	\$324 05	\$206 15	\$206 15	\$3 25	-	-
2 Barnstable County,	435 75	261 00	203 70	11 00	\$8 00	\$8 00
3 Blackstone Valley,	189 75	172 25	173 25	10 00	5 00	5 00
4 Deerfield Valley,	78 50	60 25	60 25	12 00	6 00	6 00
5 Eastern Hampden,	400 75	260 95	260 95	\$2 00	26 00	26 00
6 Essex,	403 00	262 25	262 25	7 00	4 00	4 00
7 Franklin County,	341 50	255 25	255 25	57 00	43 00	43 00
8 Hampshire,	282 75	181 00	181 00	19 00	13 75	13 75
9 Hampshire, Franklin and Hampden,	474 00	241 75	241 75	36 00	18 00	18 00
10 Highland,	109 75	89 75	89 75	5 00	5 00	5 00
11 Hillsdale,	104 00	72 75	72 75	4 00	2 50	2 50
12 Hingham (Agricultural and Horticultural),	786 05	465 30	465 30	3 50	3 00	3 00
13 Hoosac Valley,	119 75	49 75	49 75	18 00	4 00	4 00
14 Housatonic,	539 25	304 95	304 95	40 00	40 00	40 00
15 Lenox Horticultural,	1,258 00	836 00	836 00	-	-	-
16 Marshfield (Agricultural and Horticultural),	240 00	155 35	151 90	12 00	4 50	4 50
17 Martha's Vineyard,	140 00	127 50	127 50	10 00	12 60	12 60
18 Massachusetts Horticultural,	11,078 50	7,750 00	7,750 00	-	-	-
19 Massachusetts Society for Promoting Agriculture, ¹	-	-	-	-	-	-
20 Middlesex North,	260 80	194 75	194 75	-	-	-
21 Middlesex South,	346 25	127 90	127 90	-	-	-
22 Nantucket,	203 00	70 25	70 25	16 00	3 00	3 00
23 Oxford,	125 50	96 25	96 25	12 00	3 00	3 00
24 Plymouth County,	112 75	87 50	87 50	-	-	-
25 Quannapowitt (Association),	143 50	112 00	112 00	-	-	-
26 West Taunton,	257 65	199 75	199 75	75	50	50
27 Weymouth (Agricultural and Industrial),	228 25	123 60	117 80	6 50	-	-
28 Worcester,	902 00	673 00	673 00	22 00	13 00	13 00
29 Worcester North (Agricultural and Driving Association),	351 50	237 00	237 00	-	-	-
30 Worcester Northwest (Agricultural and Mechanical Association),	366 50	234 00	234 00	11 00	4 00	4 00
31 Worcester South,	191 75	146 60	70 35	23 00	23 00	5 00
32 Worcester County West,	178 25	140 20	140 20	14 00	10 00	10 00
	\$20,924 05	\$14,195 00	\$14,052 20	\$385 00	\$251 85	\$233 85

¹ Represented on the Board by special enactment, and makes no returns.

PAID, AND INSTITUTES HELD, IN THE YEAR ENDING NOV. 30, 1916 — *Continued.*

DOMESTIC MANUFACTURES.			AGRICULTURAL IMPLEMENTS.			GRANGE EXHIBITS.			
Offered.	Awarded.	Paid.	Offered.	Awarded.	Paid.	Offered.	Awarded.	Paid.	
\$180 75	\$147 25	\$147 25	-	-	-	\$90 00	\$65 00	\$65 00	1
875 25	863 80	840 00	-	-	-	40 00	-	-	2
142 00	82 75	75 75	-	-	-	35 00	20 00	20 00	3
96 00	89 85	89 85	-	-	-	-	-	-	4
92 50	83 40	83 40	-	-	-	45 00	-	-	5
94 25	48 00	48 00	\$28 00	\$5 00	\$5 00	205 00	150 00	150 00	6
121 75	68 65	68 65	-	-	-	50 00	-	-	7
80 50	67 00	67 00	-	-	-	110 00	80 00	80 00	8
157 00	136 75	136 75	-	-	-	75 00	55 00	55 00	9
129 05	107 40	107 40	-	-	-	-	-	-	10
190 00	114 25	114 25	-	-	-	25 00	12 00	12 00	11
149 75	147 80	147 80	-	-	-	50 00	30 00	30 00	12
390 00	202 10	202 10	6 00	4 00	4 00	-	-	-	13
825 70	496 50	496 50	-	-	-	130 00	115 00	115 00	14
-	-	-	-	-	-	-	-	-	15
240 00	203 00	202 80	-	-	-	30 00	25 00	25 00	16
168 50	174 95	174 95	-	-	-	-	-	-	17
-	-	-	-	-	-	-	-	-	18
-	-	-	-	-	-	-	-	-	19
114 00	77 50	77 50	-	-	-	45 00	-	-	20
118 95	77 05	77 05	-	-	-	125 00	90 00	90 00	21
140 75	112 25	112 25	-	-	-	-	-	-	22
118 45	89 55	89 55	-	-	-	50 00	40 00	40 00	23
66 50	84 20	84 20	-	-	-	50 00	50 00	50 00	24
110 00	105 25	105 25	-	-	-	430 00	430 00	430 00	25
59 25	54 50	54 50	-	-	-	-	-	-	26
197 50	96 25	96 25	-	-	-	50 00	20 00	20 00	27
255 25	204 00	204 00	-	-	-	-	-	-	28
146 15	76 05	76 05	-	-	-	-	-	-	29
116 00	66 00	66 00	-	-	-	-	-	-	30
170 00	134 60	62 95	-	-	-	120 00	120 00	105 00	31
100 55	68 00	68 00	-	-	-	-	-	-	32
\$5,146 35	\$3,778 15	\$3,676 00	\$24 00	\$9 00	\$9 00	\$1,755 00	\$1,302 00	\$1,287 00	

ANALYSIS OF GENERAL PREMIUMS AND GRATUITIES OFFERED, AWARDED AND

SOCIETIES.	ALL OTHER OBJECTS STRICTLY AGRICULTURAL.			Amount received in Entry Fees for Trotting.	Amount paid for Trotting.	Amount paid for Sports and Games.
	Offered.	Awarded.	Paid.			
1 Amesbury and Salisbury (Agricultural and Horticultural),	\$46 00	-	-	-	-	-
2 Barnstable County,	73 00	\$55 25	\$49 25	\$525 00	\$1,632 00	\$753 51
3 Blackstone Valley,	-	-	-	50 00	326 00	154 75
4 Deerfield Valley,	5 00	2 35	2 35	255 00	740 00	-
5 Eastern Hampden,	18 00	-	-	425 00	1,022 50	65 75
6 Essex,	-	-	-	-	-	50 00
7 Franklin County,	-	-	-	645 00	1,540 00	-
8 Hampshire,	-	-	-	103 50	318 75	31 60
9 Hampshire, Franklin and Hampden,	-	-	-	511 50	1,629 00	-
10 Highland,	-	-	-	10 00	40 00	-
11 Hillside,	15 00	15 00	15 00	-	-	6 00
12 Hingham (Agricultural and Horticultural),	-	-	-	-	-	-
13 Hoosac Valley,	-	-	-	635 00	1,540 00	425 00
14 Housatonic,	-	-	-	1,555 00	3,390 00	-
15 Lenox Horticultural,	-	-	-	-	-	-
16 Marshfield (Agricultural and Horticultural),	-	-	-	1,830 00	3,720 00	172 58
17 Martha's Vineyard,	-	-	-	-	-	58 25
18 Massachusetts Horticultural,	-	-	-	-	-	-
19 Massachusetts Society for Promoting Agriculture, ¹	-	-	-	-	-	-
20 Middlesex North,	*170 00	*135 00	*135 00	-	-	-
21 Middlesex South,	-	-	-	480 00	1,280 00	5 00
22 Nantucket,	8 00	-	-	90 00	300 00	28 00
23 Oxford,	-	-	-	590 00	1,200 00	-
24 Plymouth County,	-	-	-	-	-	-
25 Quannapowitt (Association),	-	-	-	460 00	1,944 90	40 81
26 West Taunton,	-	-	-	-	-	*40 00
27 Weymouth (Agricultural and Industrial),	-	-	-	350 00	960 00	342 16
28 Worcester,	-	-	-	590 00	3,028 25	783 77
29 Worcester North (Agricultural and Driving Association),	-	-	-	420 00	1,675 00	228 85
30 Worcester Northwest (Agricultural and Mechanical Association),	-	-	-	1,880 75	3,290 00	-
31 Worcester South,	-	-	-	1,010 00	2,350 00	-
32 Worcester County West,	-	-	-	299 00	750 00	189 81
	\$335 00	\$207 80	\$301 60	\$12,714 75	\$32,646 40	\$3,175 84

¹ Estimated.² Represented on the Board by special enactment, and makes no returns.

PAID, AND INSTITUTES HELD, IN THE YEAR ENDING NOV. 30, 1916 — *Concluded.*

Amount paid for Other Attractions.	NUMBER OF PERSONS RECEIVING.		Number of Cities and Towns where Premiums were paid.	Amount paid to Parties outside the State.	NUMBER OF MEMBERS.			Number of Institute Sessions held.	Average Attendance per Session.	
	Premiums.	Gratuities.			Male.	Female.	Total.			
\$1,063 12	263	-	12	\$232 00	184	36	220	4	55	1
1,233 90	185	169	12	-	201	161	362	4	64	2
250 00	200	12	10	5 00	287	256	543	1	63	3
840 00	148	17	24	12 00	983	263	1,246	3	124	4
	249	21	21	91 35	316	163	479	1	75	5
625 00	300	36	24	44 00	760	16	776	8	176	6
290 00	210	1	14	-	1,000	50	1,050	5	54	7
2,109 37	447	-	15	67 00	256	180	436	2	72	8
-	151	-	28	-	738	250	988	2	72	9
-	218	-	16	-	235	136	371	3	76	10
-	218	-	17	-	643	41	684	1	80	11
396 00	300	215	8	-	396	131	527	3	60	12
1,367 45	182	-	9	15 10	377	15	392	1	77	13
-	468	-	14	474 65	1,851	92	1,943	3	77	14
-	87	-	7	24 50	115	22	137	1	30	15
1,099 00	196	144	27	50	528	310	838	3	57	16
75 00	60	147	6	3 15	65	72	137	3	36	17
-	306	76	75	721 00	733	194	927	11	166	18
-	-	-	-	-	-	-	-	-	-	19
156 00	186	10	12	75	599	270	869	7	104	20
-	382	15	22	75 00	137	114	251	2	137	21
743 80	138	-	1	-	219	423	642	4	35	22
-	184	-	14	-	329	262	591	2	225	23
659 20	457	145	14	-	470	439	909	1	48	24
10 00	286	4	18	-	12	-	12	1	50	25
-	137	9	8	-	54	11	65	2	45	26
593 00	302	54	13	-	495	13	508	3	128	27
7,744 43	324	10	72	1,687 50	1,553	248	1,801	2	32	28
1,067 81	537	25	15	5 60	56	1	57	6	73	29
1,424 75	170	-	21	46 75	430	214	644	2	47	30
1,213 60	112	85	12	-	530	742	1,272	2	35	31
296 50	178	-	26	-	323	56	379	2	92	32
\$23,255 93	7,331	1,195	587	\$3,505 85	14,869	5,181	20,050	92	2,316	

* Decorated trucks with vegetables, fruit and flowers.

* Music.

ANALYSIS OF PREMIUMS OFFERED, AWARDED AND PAID TO

	SOCIETIES.	TOTAL PREMIUMS.		
		Offered.	Awarded.	Paid.
1	Amesbury and Salisbury (Agricultural and Horticultural),	\$244 25	\$122 40	\$122 40
2	Barnstable County,	370 00	158 00	153 75
3	Blackstone Valley,	401 75	212 00	212 00
4	Deerfield Valley,	227 25	122 25	122 25
5	Eastern Hampden,	344 40	206 50	206 50
6	Essex,	529 75	197 50	197 50
7	Franklin County,	240 75	149 75	149 75
8	Hampshire,	282 75	181 25	181 25
9	Hampshire, Franklin and Hampden,	326 00	278 25	278 25
10	Highland,	253 00	170 70	170 70
11	Hillside,	255 50	201 10	201 10
12	Hingham (Agricultural and Horticultural),	220 75	156 50	156 50
13	Hocac Valley,	287 25	145 25	145 25
14	Housatonic,	335 25	181 10	181 10
15	Lenox Horticultural,	175 75	117 25	117 25
16	Marshfield (Agricultural and Horticultural),	288 90	124 20	122 85
17	Martha's Vineyard,	198 10	124 75	124 75
18	Massachusetts Horticultural,	341 75	341 75	341 75
19	Massachusetts Society for Promoting Agriculture, ¹	-	-	-
20	Middlesex North,	172 00	161 70	161 70
21	Middlesex South,	238 30	194 25	194 25
22	Nantucket,	440 00	148 50	148 50
23	Oxford,	185 60	138 95	138 95
24	Plymouth County,	61 75	55 40	55 40
25	Quannapowitt (Association),	147 15	120 25	120 25
26	West Taunton,	77 50	50 50	50 50
27	Weymouth (Agricultural and Industrial),	247 75	117 35	116 25
28	Worcester,	433 75	299 75	299 75
29	Worcester North (Agricultural and Driving Association),	250 00	170 30	170 30
30	Worcester Northwest (Agricultural and Mechanical Association),	233 00	80 00	80 00
31	Worcester South,	198 60	170 00	129 15
32	Worcester County West,	311 20	128 00	128 00
		\$8,259 75	\$4,975 45	\$4,927 90

¹ Represented on the Board by special enactment, and makes no returns.

CHILDREN AND YOUTHS IN THE YEAR ENDING NOV. 30, 1916.

FARMS, FARM IMPROVEMENT, ETC.			FARM AND PET STOCK.			FIELD AND GARDEN CROPS.			
Offered.	Awarded.	Paid.	Offered.	Awarded.	Paid.	Offered.	Awarded.	Paid.	
-	-	-	\$87 75	\$38 50	\$38 50	-	-	-	1
-	-	-	111 00	41 50	39 50	\$30 00	-	-	2
\$10 00	\$10 00	\$10 00	198 25	88 25	88 25	-	-	-	3
-	-	-	96 25	42 00	42 00	-	-	-	4
-	-	-	157 00	86 00	86 00	-	-	-	5
62 00	-	-	163 00	83 75	83 75	16 00	-	-	6
-	-	-	81 00	42 50	42 50	-	-	-	7
57 00	57 00	57 00	46 00	25 25	25 25	-	-	-	8
-	-	-	115 00	84 25	84 25	-	-	-	9
-	-	-	58 00	57 50	57 50	-	-	-	10
-	-	-	180 50	110 75	110 75	-	-	-	11
19 00	17 50	17 50	-	-	-	36 00	\$8 00	\$8 00	12
57 00	54 00	54 00	17 00	15 00	15 00	-	-	-	13
40 00	38 00	38 00	94 00	29 50	28 50	42 00	6 00	6 00	14
96 50	96 50	96 50	-	-	-	-	-	-	15
-	-	-	25 00	4 90	4 90	48 00	-	-	16
-	-	-	17 00	57 75	57 75	-	-	-	17
-	-	-	-	-	-	-	-	-	18
-	-	-	-	-	-	-	-	-	19
52 00	66 00	66 00	32 50	20 00	20 00	-	-	-	20
-	-	-	37 50	22 25	22 25	-	-	-	21
64 00	16 00	16 00	107 00	43 25	43 25	12 00	-	-	22
12 00	8 00	8 00	48 75	30 50	30 50	2 75	2 50	2 50	23
-	-	-	15 00	13 50	13 50	-	-	-	24
-	-	-	-	-	-	-	-	-	25
-	-	-	-	-	-	-	-	-	26
90 00	31 00	31 00	15 00	11 00	11 00	-	-	-	27
-	-	-	303 75	212 25	212 25	-	-	-	28
-	-	-	-	-	-	-	-	-	29
-	-	-	27 00	17 90	17 90	-	-	-	30
24 00	9 00	9 00	18 00	10 00	10 00	-	-	-	31
12 00	12 00	12 00	77 50	70 50	52 00	-	-	-	32
18 00	6 00	6 00	163 00	50 50	50 50	-	-	-	33
\$613 50	\$421 00	\$421 00	\$2,241 75	\$1,309 05	\$1,287 55	\$186 75	\$16 50	\$16 50	

ANALYSIS OF PREMIUMS OFFERED, AWARDED AND PAID TO CHILDREN

	SOCIETIES.	FARM AND GARDEN PRODUCTS.		
		Offered.	Awarded.	Paid.
1	Amesbury and Salisbury (Agricultural and Horticultural)	\$92 25	\$35 50	\$35 50
2	Barnstable County,	113 50	42 50	41 25
3	Blackstone Valley,	91 25	60 25	60 25
4	Deerfield Valley,	66 25	40 00	40 00
5	Eastern Hampden,	107 75	96 25	96 25
6	Essex,	113 25	57 25	57 25
7	Franklin County,	92 00	56 50	56 50
8	Hampshire,	49 00	38 75	38 75
9	Hampshire, Franklin and Hampden,	77 50	77 50	77 50
10	Highland,	71 75	51 25	51 25
11	Hillside,	50 00	24 00	24 00
12	Hingham (Agricultural and Horticultural),	100 00	82 50	82 50
13	Hoosac Valley,	100 25	35 50	35 50
14	Housatonic,	45 50	23 20	23 20
15	Lenox Horticultural,	51 25	9 00	9 00
16	Marshfield (Agricultural and Horticultural),	135 90	64 00	63 65
17	Martha's Vineyard,	123 35	44 25	44 25
18	Massachusetts Horticultural,	341 75	341 75	341 75
19	Massachusetts Society for Promoting Agriculture, ¹	-	-	-
20	Middlesex North,	58 50	60 20	60 20
21	Middlesex South,	97 05	83 75	83 75
22	Nantucket,	123 00	46 50	46 50
23	Oxford,	48 85	33 85	33 85
24	Plymouth County,	21 50	21 15	21 15
25	Quannapowitt (Association),	103 40	107 55	107 55
26	West Taunton,	56 25	41 75	41 75
27	Weymouth (Agricultural and Industrial),	104 00	64 66	64 05
28	Worcester,	113 00	82 00	82 00
29	Worcester North (Agricultural and Driving Association),	125 00	65 10	65 10
30	Worcester Northwest (Agricultural and Mechanical Association),	83 75	31 25	31 25
31	Worcester South,	49 00	53 75	39 90
32	Worcester County West,	80 75	47 00	47 00
		\$2,886 55	\$1,918 45	\$1,902 40

¹ Apple-judging contest.² Bird houses, farm models and collections of insects and weeds, etc.³ Corn, potato and stock judging.⁴ Judging grains and vegetables, and records in egg and pork production, home economics and canning and marketing.

AND YOUTHS IN THE YEAR ENDING NOV. 30, 1916 — *Concluded.*

DOMESTIC MANUFACTURES.			ALL OTHER OBJECTS STRICTLY AGRICULTURAL.		
Offered.	Awarded.	Paid.	Offered.	Awarded.	Paid.
\$64 25	\$48 40	\$48 40	-	-	-
115 50	74 00	73 00	-	-	-
102 25	53 50	53 50	-	-	-
34 50	25 25	25 25	\$30 25	\$15 00	\$15 00
73 15	17 75	17 75	1 6 50	1 6 50	1 6 50
109 50	31 75	31 75	2 66 00	2 24 75	2 24 75
47 50	23 25	23 25	2 20 25	2 18 50	2 18 50
34 75	14 25	14 25	4 46 00	4 46 00	4 46 00
109 50	97 00	97 00	5 24 00	5 19 50	5 19 50
123 25	61 95	61 95	-	-	-
75 00	66 35	66 35	-	-	-
65 75	48 50	48 50	-	-	-
68 75	35 00	35 00	6 34 25	6 5 75	6 5 75
113 75	35 40	35 40	-	-	-
28 00	11 75	11 75	-	-	-
80 00	55 30	54 30	-	-	-
52 75	22 75	22 75	-	-	-
-	-	-	-	-	-
29 00	15 50	15 50	-	-	-
108 75	88 25	88 25	-	-	-
134 00	42 75	42 75	-	-	-
29 75	20 60	20 60	8 43 50	8 43 50	8 43 50
25 25	20 75	20 75	-	-	-
43 75	12 70	12 70	-	-	-
21 25	8 75	8 75	-	-	-
35 75	10 70	10 30	-	-	-
17 00	5 50	5 50	-	-	-
98 00	87 30	87 30	-	-	-
107 25	29 75	29 75	-	-	-
55 10	33 75	25 25	-	-	-
49 45	24 50	24 50	-	-	-
\$2,050 45	\$1,131 95	\$1,120 95	\$370 75	\$179 50	\$179 50

* Corn, potato and canned products judging, and horsemanship.

* Includes scoring vegetables, \$13.50.

* Represented on the Board by special enactment, and makes no returns.

* Judging corn, potatoes and tomatoes.

DIRECTORY
OF THE
AGRICULTURAL AND SIMILAR ORGANIZATIONS
OF MASSACHUSETTS

1917

STATE BOARD OF AGRICULTURE, 1917.

Members ex Officio.

HIS EXCELLENCY SAMUEL W. MCCALL.
 KENYON L. BUTTERFIELD, *President Massachusetts Agricultural College.*
 LESTER H. HOWARD, *Commissioner of Animal Industry.*
 F. WILLIAM RANE, *State Forester.*
 WILFRID WHEELER, *Secretary of the Board.*

Members appointed by the Governor and Council. Term expires¹

HENRY M. HOWARD of Newton (P. O., West Newton),	. . . . .	1917
EDWARD E. CHAPMAN of Ludlow,	. . . . .	1918
FRANK P. NEWKIRK of Easthampton,	. . . . .	1919

Members chosen by the Incorporated Societies.

<i>Amesbury and Salisbury (Agricultural and Horticultural),</i>	. . . . .	A. WILLIS BARTLETT of Salisbury,	. . . . .	1917
<i>Barnstable County,</i>	. . . . .	JOHN BURSLEY of Barnstable (P. O., West Barnstable),	. . . . .	1918
<i>Blackstone Valley,</i>	. . . . .	JACOB A. WILLIAMS of Northbridge,	. . . . .	1917
<i>Deerfield Valley,</i>	. . . . .	STEPHEN W. HAWKES of Charlemont,	. . . . .	1919
<i>Eastern Hampden,</i>	. . . . .	OMER E. BRADWAY of Monson,	. . . . .	1917
<i>Essex,</i>	. . . . .	FREDERICK A. RUSSELL of Methuen,	. . . . .	1919
<i>Franklin County,</i>	. . . . .	GEORGE E. TAYLOR, Jr., of Shelburne,	. . . . .	1918
<i>Hampshire,</i>	. . . . .	HOWARD A. PARSONS of Amherst (P. O., North Amherst),	. . . . .	1918
<i>Hampshire, Franklin and Hampden,</i>	. . . . .	CLARENCE E. HODGKINS of Northampton,	. . . . .	1917
<i>Highland,</i>	. . . . .	HARRY A. FORD of Dalton,	. . . . .	1919
<i>Hillside,</i>	. . . . .	MILTON S. HOWES of Cummington (P. O., Swift River),	. . . . .	1919
<i>Hingham (Agricultural and Horticultural),</i>	. . . . .	URBAN S. BATES of Hingham,	. . . . .	1917
<i>Hoosac Valley,</i>	. . . . .	NATHAN B. FLOOD of North Adams,	. . . . .	1917
<i>Housatonic,</i>	. . . . .	CHARLES W. FREEHAN of Great Barrington,	. . . . .	1917
<i>Lenox Horticultural,</i>	. . . . .	ALFRED H. WINGETT of Lenox,	. . . . .	1919
<i>Marshfield (Agricultural and Horticultural),</i>	. . . . .	WALTER H. FAUNCE of Kingston,	. . . . .	1917
<i>Martha's Vineyard,</i>	. . . . .	JAMES F. ADAMS of West Tisbury,	. . . . .	1918
<i>Massachusetts Horticultural,</i>	. . . . .	EDWARD B. WILDER of Dorchester,	. . . . .	1917
<i>Massachusetts Society for Promoting Agriculture,</i>	. . . . .	NATHANIEL I. BOWDITCH of Framingham,	. . . . .	1917
<i>Middlesex North,</i>	. . . . .	GEORGE W. TRULL of Tewksbury (P. O., Lowell, R. F. D.),	. . . . .	1919
<i>Middlesex South,</i>	. . . . .	JOHN J. ERWIN of Wayland,	. . . . .	1919
<i>Nantucket,</i>	. . . . .	HERBERT G. WORTH of Nantucket,	. . . . .	1917
<i>Oxford,</i>	. . . . .	JOHN F. FREELAND of Sutton,	. . . . .	1918

¹ First Tuesday in December.

	Term expires ¹
<i>Plymouth County</i> , ERNEST LEACH of Bridgewater,	1919
<i>Quannapowitt</i> , CALVERT H. PLAYDON, D.V.S., of Reading,	1918
<i>West Taunton</i> , CHARLES I. KING of Taunton,	1919
<i>Weymouth (Agricultural and Horticultural)</i> , HOWARD H. JOY of Weymouth (P. O., South Weymouth),	1917
<i>Worcester</i> , CHARLES H. ELLSWORTH of Worcester,	1919
<i>Worcester North (Agricultural and Driving Association)</i> , HENRY D. CLARK, D.V.S., of Fitchburg,	1917
<i>Worcester Northwest (Agricultural and Mechanical)</i> , ALBERT ELLSWORTH of Athol,	1918
<i>Worcester South</i> , WILLIAM E. PATRICK of Warren,	1918
<i>Worcester County West</i> , LOUIS H. RUGGLES of Hardwick,	1919

Member chosen by the Massachusetts Federation of County Leagues and Farm Bureaus.

L. L. RICHARDSON of Leominster, 1918

¹ First Tuesday in December.

ORGANIZATION OF THE BOARD.

OFFICERS.

<i>President,</i>	His EXCELLENCY SAMUEL W. McCALL, <i>ex officio</i> .
<i>First Vice-President,</i>	JOHN BURSLEY of Barnstable.
<i>Second Vice-President,</i>	FREDERICK A. RUSSELL of Methuen.
<i>Secretary,</i>	WILFRID WHEELER of Concord.

Office, Room 136, State House, Boston.

COMMITTEES.

Executive Committee.

Messrs. JOHN BURSLEY of Barnstable.
 O. E. BRADWAY of Monson.
 GEORGE W. TRULL of Tewksbury.
 WILLIAM E. PATRICK of Warren.
 FREDERICK A. RUSSELL of Methuen.
 HENRY M. HOWARD of Newton.
 GEORGE E. TAYLOR, Jr., of Shelburne.
 JACOB A. WILLIAMS of Northbridge.
 A. WILLIS BARTLETT of Salisbury.

Committee on Agricultural Societies.

Messrs. O. E. BRADWAY of Monson.
 ALBERT ELLSWORTH of Athol.
 JACOB A. WILLIAMS of Northbridge.
 HERBERT G. WORTH of Nantucket.
 HOWARD A. PARSONS of Amherst.
 CHARLES I. KING of Taunton.

Committee on Domestic Animals, Poultry and Dairy Products.

Messrs. WILLIAM E. PATRICK of Warren.
 HERBERT G. WORTH of Nantucket.
 HENRY D. CLARK of Fitchburg.
 JOHN F. FREELAND of Sutton.
 HARRY A. FORD of Dalton.

Committee on the Massachusetts Agri- cultural College and the Massachu- setts Agricultural Experiment Sta- tion.

Messrs. JOHN BURSLEY of Barnstable.
 FRANK P. NEWKIRK of Easthampton.
 WILLIAM E. PATRICK of Warren.
 JOHN J. ERWIN of Wayland.
 CHARLES W. FREEHAN of Great Bar-
 rington.

Committee on Orchardng and Fruit Growing.

Messrs. FREDERICK A. RUSSELL of Methuen.
 ALFRED H. WINGETT of Lenox.
 EDWARD B. WILDER of Dorchester.
 STEPHEN W. HAWKES of Charlemont.
 HENRY M. HOWARD of Newton.

Committee on Grasses and Forage Crops.

Messrs. GEORGE E. TAYLOR, Jr., of Shel-
 burne.
 U. S. BATES of Hingham.
 N. I. BOWDITCH of Framingham.
 CALVERT H. PLATDON of Reading.
 CHARLES H. ELLSWORTH of Worces-
 ter.

Committee on Markets and Trans- portation.

Messrs. A. WILLIS BARTLETT of Salisbury.
 CHARLES I. KING of Taunton.
 NATHAN B. FLOOD of North Adams.
 EDWARD E. CHAPMAN of Ludlow.
 CHARLES W. FREEHAN of Great Bar-
 rington.

Committee on Farm Tools and Machinery.

Messrs. JACOB A. WILLIAMS of Northbridge.
 ERNEST LEACH of Bridgewater.
 CLARENCE E. HODGKINS of North-
 ampton.
 H. H. JOY of Weymouth.
 MILTON S. HOWES of Cummington.

Committee on Institutes and Public Meetings.

Messrs. GEORGE W. TRULL of Tewksbury.
 JAMES F. ADAMS of West Tisbury.
 GEORGE E. TAYLOR, Jr., of Shelburne.
 CLARENCE E. HODGKINS of Northampton.
 L. L. RICHARDSON of Leominster.

Committee on Irrigation and Drainage.

Messrs. HENRY M. HOWARD of Newton.
 JOHN J. ERWIN of Wayland.
 WALTER H. FAUNCE of Kingston.
 CLARENCE E. HODGKINS of Northampton.
 LOUIS H. RUGGLES of Hardwick.

The Secretary is a member, *ex officio*, of the above committees.

DAIRY BUREAU.

Messrs. GEORGE E. TAYLOR, Jr., of Shelburne, 1917; O. E. BRADWAY of Monson, 1918;
 GEORGE W. TRULL of Tewksbury, 1919.

Executive Officer, WILFRID WHEELER of Concord.
General Agent, P. M. HARWOOD of Barre.

Office, Room 136, State House.

STATE NURSERY INSPECTOR.

HENRY T. FERNALD, Ph.D., of Amherst.

STATE ORNITHOLOGIST.

EDWARD HOWE FORBUSH of Westborough.

STATE INSPECTOR OF APIARIES.

BURTON N. GATES, Ph.D., of Amherst.

SPECIALISTS.

<i>Chemist,</i>	J. B. LINDSEY,	Amherst.
<i>Entomologist,</i>	C. H. FERNALD,	Amherst.
<i>Botanist,</i>	A. VINCENT OSMUN,	Amherst.
<i>Pomologist,</i>	F. C. SEARS,	Amherst.
<i>Veterinarian,</i>	JAMES B. PAIGE,	Amherst.
<i>Engineer,</i>	WILLIAM WHEELER,	Concord.
<i>Agricultural Club Work,</i>	WILLIAM R. HART,	Amherst.

MASSACHUSETTS AGRICULTURAL COLLEGE.

*Location, Amherst, Hampshire County.***The Corporation.**

MEMBERS OF THE CORPORATION.		Term expires
CHARLES H. PRESTON of Danvers,		1918
FRANK A. HOSMER of Amherst,		1918
DAVIS R. DEWEY of Cambridge,		1919
JOHN F. GANNON of Worcester,		1919
ARTHUR G. POLLARD of Lowell,		1920
GEORGE H. ELLIS of West Newton,		1920
ELMER D. HOWE of Marlborough,		1921
EDMUND MORTIMER of Grafton,		1921
NATHANIEL I. BOWDITCH of Framingham,		1922
WILLIAM WHEELER of Concord,		1922
CHARLES A. GLEASON of New Braintree,		1923
JAMES F. BACON of Boston,		1923
FRANK GERRETT of Greenfield,		1924
HAROLD L. FROST of Arlington,		1924

MEMBERS EX OFFICIIS.

HIS EXCELLENCY SAMUEL W. MCCALL,	<i>President of the Corporation.</i>
KENTON L. BUTTERFIELD,	<i>President of the College.</i>
PATSON SMITH,	<i>State Commissioner of Education.</i>
WILFRID WHEELER,	<i>Secretary of the State Board of Agriculture.</i>

OFFICERS OF THE CORPORATION.

HIS EXCELLENCY GOVERNOR SAMUEL W. MCCALL of Winchester,	<i>President.</i>
CHARLES A. GLEASON of New Braintree,	<i>Vice-President.</i>
WILFRID WHEELER of Concord,	<i>Secretary.</i>
FRED C. KENNEY of Amherst,	<i>Treasurer.</i>
CHARLES A. GLEASON of New Braintree,	<i>Auditor.</i>

EXAMINING COMMITTEE OF OVERSEERS FROM THE STATE BOARD OF AGRICULTURE.

JOHN BURSLEY of Barnstable.
 FRANK P. NEWKIRK of Easthampton.
 WILLIAM E. PATRICK of Watten.
 JOHN J. ERWIN of Wayland.
 CHARLES W. FREEHAN of Great Barrington.

MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

WILLIAM P. BROOKS, Ph.D.,	<i>Director.</i>
JOSEPH B. LINDSEY, Ph.D.,	<i>Vice-Director.</i>
FRANK A. WAUGH, M.Sc.,	<i>Horticulturist.</i>
F. C. SEARS,	<i>Pomologist.</i>
HENRY T. FERNALD, Ph.D.,	<i>Entomologist.</i>
JAMES B. PAIGE, B.Sc., D.V.S.,	<i>Veterinarian.</i>
JOHN E. OSTRANDER, A.M., C.E.,	<i>Meteorologist.</i>

AGRICULTURAL SOCIETIES INCORPORATED BY SPECIAL ACT OF THE LEGISLATURE, AND REPRESENTED ON THE BOARD OF AGRICULTURE.

NAME.	PRESIDENT.	SECRETARY.	TREASURER.
Amesbury and Salisbury, ¹	A. Willis Bartlett, Salisbury.	M. H. Sands, Amesbury.	Edwin W. Paige, Amesbury.
Barnstable County,	Thomas C. Thacher, Yarmouth.	Marcus N. Harris, Barnstable.	Henry C. Davis, Cummaquid.
Blackstone Valley,	W. A. L. Bazeley, Uxbridge.	M. R. Sharpe, Uxbridge.	C. A. Barton, Uxbridge.
Deerfield Valley,	Charles W. Trow, Buckland.	Francis W. Avery, Charlemont.	Charles T. Haskins, Charlemont.
Eastern Hampden,	Frank J. Hamilton, Palmer.	Fred E. Cady, Monson.	J. B. Dawson, Palmer.
Essex,	Herbert W. Mason, Ipswich.	Walter H. Brown, Peabody.	W. S. Nichols, Salem.
Franklin County,	Frederick W. Burnham, Greenfield.	J. H. Murphy, Greenfield.	Ezra C. Wilcox, Greenfield.
Hampshire,	Francis E. Farrar, Amherst.	James W. T. Davis, Amherst.	James W. T. Davis, Amherst.
Hampshire, Franklin and Hampden, Highland,	Clarence E. Hodgkins, Northampton. H. A. Ford, Windsor (P. O., Dalton).	Alvertus J. Morse, Northampton. John T. Bryan, Middlefield (P. O., Chester, R. F. D.).	Alvertus J. Morse, Northampton. W. A. Olds, Middlefield.
Hillside,	Charles A. Bixbee, Chesterfield.	Allen B. Doggett, Jr., Cummington.	Howard E. Drake, Cummington.
Hingham, ¹	Edgar M. Lane, Hingham Center.	Harry W. Young, South Hingham.	Harry F. Zahn, Hingham Center.
Hoosac Valley,	F. D. Stafford, North Adams.	William G. Carter, North Adams.	C. M. Oxtman, North Adams.
Housatonic,	Henry P. Comstock, Great Barrington. ton.	Joseph H. Maloney, Great Barrington.	George L. Taylor, Great Barrington.
Lenox Horticultural,	George A. Breed, Stockbridge.	Lewis Barnet, Allen Winden Farm, Lenox.	A. J. Loveless, Lenox.
Marshfield, ¹	Thomas W. Lawson, Boston.	Israel H. Hatch, Marshfield (P. O., Marshfield).	M. Herman Kent, Marshfield.
Martha's Vineyard,	Henry B. Davis, Chilmark.	Leroy W. Luce, Chilmark.	George Hunt Luce, West Tibury.
Massachusetts Horticultural, Massachusetts Society for Promoting Agri- culture,	Richard N. Saltonstall, Newton. Charles Sprague Sargent, Brookline.	William P. Rich, 300 Massachusetts Ave., Boston. Francis Henry Appleton, Peabody, and 251 Marlboro St., Boston.	Walter Hunnewell, 87 Milk St., Bos- ton. Richard M. Saltonstall, Newton.
Middlesex North,	George W. Trull, Tewksbury (P. O., Lowell, R. F. D.).	George H. Upton, Lowell.	John A. Weinbeck, Lowell.

Middlesex South,	.	.	.	.	.	John P. Bowditch, Framingham.	Peter N. Everett, Framingham.	George E. Fay, Framingham.
Nantucket,	.	.	.	.	.	John H. Bartlett, Nantucket.	W. W. Battelle, Nantucket.	Benjamin F. Worth, Nantucket.
Oxford,	.	.	.	.	.	Walter E. Schuster, Douglas (P. O., East Douglas).	James E. Darling, Oxford.	George E. Chaffee, Oxford.
Plymouth County,	.	.	.	.	.	Ernest Leach, Bridgewater.	Howard B. Wilbur, West Bridgewater and Barristers' Hall, Brockton.	Howard B. Wilbur, West Bridgewater and Barristers' Hall, Brockton.
Quannapowitt, . . . . .	.	.	.	.	.	Henry A. Upton, North Reading.	Arthur H. Jewett, Reading.	Arthur W. Coolidge, Norwood.
Union, ¹ . . . . .	.	.	.	.	.	Joseph P. Haley, Blandford.	Charles E. Whitney, Blandford.	George O. Millard, Blandford.
West Taunton, . . . . .	.	.	.	.	.	Mason E. Marvel, Taunton.	Charles I. King, Taunton.	Whitman Chase, Taunton.
Weymouth (Agricultural and Industrial), . . . . .	.	.	.	.	.	Ralph P. Burrell, Weymouth (P. O., South Weymouth).	Thomas V. Nash, Weymouth (P. O., South Weymouth).	D. Frank Daly, Weymouth (P. O., South Weymouth).
Worcester, . . . . .	.	.	.	.	.	W. D. Ross, Worcester.	B. Durrell, Worcester.	L. F. Herrick, Worcester.
Worcester East, . . . . .	.	.	.	.	.	John E. Thayer, Lancaster.	Warren Goodale, Clinton.	John W. Forrester, Clinton.
Worcester North (Agricultural and Driving Association), . . . . .	.	.	.	.	.	L. L. Richardson, Leominster.	T. Carlton Upham, 17 Longwood Ave., Worcester.	Robert Marcy, Fitchburg.
Worcester Northwest (Agricultural and Mechanical), . . . . .	.	.	.	.	.	Wilson H. Lee, New Haven, Conn.	Walter B. Lawton, Athol.	Clarence E. Deane, Athol.
Worcester South, . . . . .	.	.	.	.	.	Frank F. Phinney, Sturbridge.	Elliott L. Clemence, Southbridge.	Elliott L. Clemence, Southbridge.
Worcester County West, . . . . .	.	.	.	.	.	William A. Gaston, Shawmut Bank Building, Boston and Barre.	D. H. Rice, Barre.	John S. Rice, Barre.

¹ And horticultural.

HORTICULTURAL SOCIETIES.

NAME.	LOCATION.	PRESIDENT.	SECRETARY.
Hampden County,	Springfield,	J. Alden Davis, 36 Groveland St., Springfield.	Marshall Headle, 458 Dickinson St., Springfield.
Houghton,	Lynn,	Dr. Frank L. Whipple, 61 Maple St., Lynn.	Miss Mary J. Scanlan, 15 Wells Pl., Lynn.
Medford,	Medford,	Mrs. Lester H. Williams, 62 Beacon St., Boston.	Mrs. Ruth Wales Randall, 53 Forest St., Medford.
Melrose Horticultural and Improvement,	Melrose,	George D. Orton, 10 Ashland Pl., Melrose Highlands.	Mrs. R. O. Stantial, 55 Meridian St., Melrose.
New Bedford,	New Bedford,	Leonard J. Hathaway, Jr., Clifford St., New Bedford.	Jeremiah M. Taber, 388 Rockdale Ave., New Bedford.
Worcester County,	Worcester,	Arthur E. Hartshorn, 193 May St., Worcester.	Herbert R. Kinney, Olean St., Worcester.

FARMERS' AND MECHANICS' CLUBS AND ASSOCIATIONS.

Belchertown,	Belchertown,	Dwight F. Shumway, Belchertown.	R. E. Fairchild, Belchertown.
Bolton, ¹	Bolton,	Gilbert H. Wheeler, Bolton.	Harry W. Butts, Bolton.
Holden,	Holden,	William Piper, Holden.	Frank C. Hubbard, Jefferson.
Needham, ¹	Needham,	George W. Smith, Wellesley Hills.	Cyrus F. Jenness, 69 Moffatt Rd., Waban.
Pepperell,	Pepperell,	William E. Chapman, Pepperell.	Leroy A. Shattuck, Pepperell.
Shrewsbury,	Shrewsbury,	E. A. Bartlett, Shrewsbury.	F. J. Stone, Shrewsbury.
Westminster, ¹	Westminster,	Carlos E. Barron, Westminster.	George A. Sargent, Westminster.

¹ Association.

FARMERS' CO-OPERATIVE EXCHANGES.

Abington Strawberry Growers' Co-operative Exchange.	Abington,	-	-	Charles O'Bloxham, Abington.
Amherst Co-operative Supply Association.	Amherst,	-	-	Dr. A. E. Cance, M. A. C., Amherst.
Ashfield Farmers' Co-operative Exchange.	Ashfield,	-	-	Albert Howes, Ashfield.
Barre Farmers' Co-operative Exchange.	Barre,	-	-	Henry B. Read, Barre.
Bedford Co-operative Corporation Exchange.	Bedford,	George F. Smith, Barre.	-	Ernest A. Brown (treasurer), Bedford.
Brier Co-operative Creamery Exchange.	Savoy,	-	-	Elliot Barber, Savoy.
Brimfield Farmers' Co-operative Exchange.	Brimfield,	-	-	H. C. Maddocks, Brimfield.
Deerfield and Sunderland Farmers' Co-operative Exchange.	Deerfield and Sunderland,	-	-	E. C. Fairbank, South Deerfield.
Hardwick Farmers' Co-operative Exchange.	Hardwick,	Moses R. Page, Hardwick.	-	R. D. Lull, Hardwick.
Heath Farmers' Co-operative Exchange.	Heath,	-	-	Ernest E. Kinsman, Griswoldville.
Highland Co-operative Fruit Exchange.	Highland,	-	-	Ralph F. Barnes, Marlborough.
Lowell Suburban Dairy Association.	Lowell,	-	-	Walter S. Holder, Chelmsford.
Petersham Farmers' Exchange.	Petersham,	George Wilder, Petersham.	-	C. N. Gates, Petersham.
Sutton Farmers' Co-operative Company.	Sutton,	-	-	Geo. L. Stockwell, Sutton.
Upton Farmers' Co-operative Exchange.	Upton,	Joseph A. Carroll, Upton.	-	Harriet J. Richardson, Upton.
Warren Farmers' Co-operative Exchange.	Warren,	Herbert N. Shepard, Warren.	-	Edward D. Sullivan, Warren.
Worcester County Farmers' Co-operative Exchange.	Worcester County,	-	-	N. P. Tyler, Sterling Junction.

FARMERS' CLUBS.

NAME.	LOCATION.	PRESIDENT.	SECRETARY.
Borborough,	Borborough,	Richard Y. Nelson, West Acton, R. F. D.	George W. Burroughs, West Acton.
Buckland,	Buckland,	W. S. Williams, Buckland.	Mrs. J. W. Moulton, Buckland.
Concord,	Concord,	Charles W. Prescott, ¹ Concord.	George M. Baker, Concord.
East Charlemont,	East Charlemont,	Wm. B. Avery, East Charlemont.	Jennie R. Ballards, East Charlemont.
Easthampton,	Easthampton,	Edwin B. Clapp, 325 South Main St., Easthampton.	James A. Sturges, 92 Northampton St., East- hampton.
Easton,	Easton,	Wm. McLeod, Easton.	Wilmarth P. Howard, South Easton.
Franklin,	Franklin,	Alden T. Mann, King St., Franklin.	R. A. Messerli, Union St., Franklin.
Halifax,	Halifax,	James T. Thomas, Halifax.	Mrs. Carrie A. Hayward, Halifax.
Medway,	Medway,	Arthur F. Wilson, Medway, R. F. D.	Mrs. Clara Partridge, Holliston.
New Braintree,	New Braintree,	Frank A. Morse, New Braintree.	Mrs. James T. Greene, New Braintree.
Oakham,	Oakham,	W. W. Russell, Oakham.	Miss Lila Parkman, Oakham.
South Bristol,	New Bedford,	Elmer M. Poole, North Dartmouth.	Allen Russell, Acushnet.
Tatnuck,	Worcester,	George Kinney, 32 Olean St., Worces- ter.	Mrs. Sue M. Austin, 10 Moore Ave., Worces- ter.
Upton,	Upton,	Benjamin C. Wood, West Upton.	Edward B. Newton, Upton.
West Brookfield,	West Brookfield,	William L. Day, Warren.	Sumner H. Reed, Brookfield.

¹ Deceased.

POULTRY ASSOCIATIONS.

Abington Poultry Association, Inc.,	Abington,	Charles E. Allen, 122 Walnut St., Abington.	Leroy Grinnell, 196 Chapel St., Abington.
Amherst Poultry Association, Inc.,	Amherst,	William H. Abbott, 35 Northampton Rd., Amherst.	Stephen Marsh, Amherst.
Attleboro Poultry Association, Inc.,	Attleboro,	William H. Saart, Forest St., Attleboro.	Leonard Hinds, 78 Dennis St., Attleboro.
Boston Poultry Association, Inc.,	Boston,	John Lowell, Chestnut Hill.	W. B. Atherton, 36 Bromfield St., Boston.
Dalton Poultry, Pigeon and Pet Stock Association, Inc.,	Dalton,	Charles E. Wilner, Coatsville, Dalton.	Walter C. Reed, Box 186, Dalton.
Eastern Massachusetts Poultry and Pigeon Association, Inc.,	Everett,	W. B. Sanders, 47 1/2 Broadway, Everett.	S. J. Godfrey, 77 Clark Ave., Chelsea.
Essex County Poultry Association, Inc.,	Essex County,	J. D. Barnes, Wenham.	Arthur Elliott, Peabody.
Gloucester Poultry Association, Inc.,	Gloucester,	Willard F. Mitchell, 18 Gloucester Ave., Gloucester.	Ernest Deacon, Annisquam.
Holyoke Poultry and Pet Stock Association, Inc.,	Holyoke,	A. C. Chapin, 354 Chicopee St., Chicopee.	John W. Young, 1 Sonoma Place, Holyoke.
Lawrence Poultry, Pigeon and Pet Stock Association, Inc.,	Lawrence,	Joseph Adams, 62 Woodland St., Lawrence.	F. J. Borneman, 10 Moran Ct., Lawrence.
Lenox Poultry Association, Inc.,	Lenox,	William J. Welsh, Lenox.	George A. Mole, Lenox.
Mansfield Poultry, Pigeon and Pet Stock Association, Inc.,	Mansfield,	C. H. Budlong, Providence, R. I.	L. Faye Howe, 56 Draper Ave., Mansfield.
Massachusetts Poultry Association, Inc.,	Boston,	Charles L. Wilder, Lancaster.	Charles E. Allen, 111 Devonshire St., Boston.
Massachusetts Poultry Society,	Worcester,	Maurice F. Delano, Vineyard Haven.	Charles H. Wood, 715 State Mutual Building, Worcester.
Milford Poultry Association, Inc.,	Milford,	J. Frank Despaux, West Upton.	W. H. Pyne, Milford.
New England Poultry Association, Inc.,	Greenfield,	Solon H. Stone, 4 Walnut St., Greenfield.	Frank J. Hochrim, 21 Riddell St., Greenfield.
Northern Berkshire Poultry Association, Inc.,	North Adams,	A. F. Dodge, Pittsfield.	Albert Whitney, 29 Nelson St., North Adams.
Northampton Poultry Association, Inc.,	Northampton,	Will N. Doane, 31 Forbes Ave., Northampton.	Sylvester E. Hoxie, 44 North Elm St., Northampton.
Norwood Poultry Association, Inc.,	Norwood,	Willis C. Fuller, 402 Washington St., Norwood.	Edward D. Baker, 88 Nichols St., Norwood.

POULTRY ASSOCIATIONS — *Concluded.*

NAME.	LOCATION.	PRESIDENT.	SECRETARY.
Quannapowitt Poultry Association, Inc., . .	Wakefield, . . .	W. W. Greenough, Wakefield.	W. S. Goodwin, Greenwood.
Shelburne Falls Poultry Association, Inc., .	— . . .	— . . .	— . . .
Southern Massachusetts Poultry and Pet Stock Association, Inc.	New Bedford, . . .	Bancroft Winsor, Acushnet.	Dr. S. D. Perry, 736 Pleasant St., New Bedford.
South Shore Poultry Club,	North Hanover, . . .	Fred Cann, R. F. D., Route 1, Rockland.	Arthur W. Sides, R. F. D., Route 1, Rockland.
Springfield Poultry Club, Inc.,	Springfield, . . .	J. H. Whitcomb, Box 1226, Springfield.	George L. Collier, Box 1236, Springfield.
Taunton Poultry Association, Inc.,	Taunton,	Harry W. Parkey, Segregeanet.	Walton W. Viles, Raynham Center.
Worcester North Poultry Association, . . .	Fitchburg and vicinity, . . .	Charles L. Wilder, Lancaster.	H. E. Spaulding, 16 Thomas St., Fitchburg.
Worcester Poultry Association, Inc., . . .	Worcester,	Louis T. C. Loring, Shrewsbury.	Charles H. Wood, 715 State Mutual Building, Worcester.

BEEKEEPERS' SOCIETIES AND ASSOCIATIONS.

Berkshire County Beekeepers' Association, .	Berkshire County, . . .	C. M. Musgrove, Pittsfield, R. F. D.	John Buckler, Pittsfield, R. F. D.
Eastern Massachusetts Society of Beekeepers, .	Boston,	Thomas J. Hawkins, 4 Emory St., Everett.	Benjamin P. Sands, 1051 Old South Building, Boston.
German Bee Society,	Lawrence and Methuen, . . .	Robert Hoffman, 42 Brook St., Lawrence.	August Seiferth, 34 Lippold St., Lawrence.
Hampshire, Hampden and Franklin Beekeepers' Association.	Hampshire, Hampden and Franklin counties.	O. M. Smith, Florence.	Burton N. Gates, Amherst.
Massachusetts Society of Beekeepers, . . .	The State,	Frank W. Frisbee, 46 Stonington St., North Andover.	Philip S. Crichton, 2 Carver St., Cambridge.
State Beekeepers' Association of Massachusetts, .	The State,	John L. Byard, Amherst.	Burton N. Gates, Amherst.
Worcester County Beekeepers' Association, .	Worcester,	Herbert C. Bradish, West Boylston.	Miss Josephine Morse, South Lancaster.

FARM BUREAUS AND COUNTY IMPROVEMENT LEAGUES.

NAME.	LOCATION.	PRESIDENT.	COUNTY AGENT.
Berkshire County Farm Bureau, Inc., . . .	Berkshire County, . . .	Fred G. Craue, Dalton.	F. E. Peck, Pittsfield.
Cape Cod Farm Bureau, . . .	Barnstable County, . . .	Thomas C. Thacher, Yarmouthport.	L. B. Boston, Sandwich.
Franklin County Farm Bureau, Inc., . . .	Franklin County, . . .	Joseph W. Stevens, First National Bank, Greenfield.	J. H. Putnam, Greenfield.
Hampden County Improvement League, . . .	Hampden County, . . .	Horace A. Moses, Strathmore Paper Company, Mittineague.	C. J. Grant, Springfield.
Hampshire County Farm Bureau, . . .	Hampshire County, . . .	Charles R. Damon, Williamsburg.	A. F. MacDougall, Northampton.
Middlesex County Farm Bureau, . . .	Middlesex County, . . .	N. I. Bowditch, Framingham.	- - -
Plymouth County Farm Bureau, . . .	Plymouth County, . . .	Lyman P. Thomas, Rock.	Bertram Tupper, 23 Main St., Brockton.
Worcester County Farm Bureau, Inc., . . .	Worcester County, . . .	J. Lewis Ellsworth, 325 Salisbury St., Worcester.	Charles H. White, North Uxbridge.
Massachusetts Federation of County Farm Bureaus and Improvement Leagues.	The State, . . .	Horace A. Moses, Mittineague.	J. D. Willard, 12 Sheldon Block, Greenfield, Secretary.

COUNTY AGRICULTURAL SCHOOLS.

NAME.	LOCATION.	DIRECTOR.	COUNTY AGENT.
Essex County Agricultural School, . . .	Hathorne, . . .	F. A. Smith, Hathorne.	F. Howard Brown, Hathorne.
Bristol County Agricultural School, . . .	Segreganset, . . .	G. H. Gilbert, Segreganset.	W. Ide, Segreganset.
Norfolk County Agricultural School, . . .	Walpole, . . .	F. W. Kingman, Walpole.	W. A. Munson, Walpole.

MISCELLANEOUS.

NAME.	LOCATION.	PRESIDENT.	SECRETARY.
Boston Market Gardeners' Association, . . .	Boston, . . .	J. Winthrop Stone, Watertown.	J. B. Shurtleff, Revere.
Brockton Agricultural Society, . . .	Brockton, . . .	W. B. Cross, Brockton.	P. G. Flint, 45 Emerson Ave., Brockton.
Cape Cod Cranberry Growers' Association, . . .	Wareham, . . .	John C. Makepeace, Wareham.	Lemuel C. Hall, Wareham.
Connecticut Valley Breeders' Association, . . .	Amherst, . . .	J. G. Cook, Amherst, R. F. D.	J. C. McNutt, Amherst.
Franklin Harvest Club, . . .	Franklin and Hampshire, . . .	A. E. Peck, Shelburne.	H. N. Loomis, Franklin St., Northampton.
Gardeners' and Florists' Club of Boston, . . .	Boston, . . .	James Methuen, Readville.	William N. Craig, Faulkner Farm, Brookline.
Hampden County Fair, Inc., . . .	Holyoke, . . .	Dr. Thos. J. Shinkwin, 2 Main St., Holyoke.	David H. Young, Holyoke, P. O. Box 85.
Hampden Harvest Club, . . .	Connecticut Valley, . . .	No regular president.	Edward M. Burt, East Longmeadow.
Massachusetts Agricultural Club, . . .	Boston, . . .	Charles L. Hutchins, Concord.	Gordon Hutchins, Concord.
Massachusetts Alfalfa Growers' Association, . . .	The State, . . .	L. E. Mayo, Harding.	Wilfrid Wheeler, Concord.
Massachusetts Asparagus Growers' Association, . . .	The State, . . .	C. W. Prescott. ¹	Wilfrid Wheeler, Concord.
Massachusetts Creamerymen's Association, . . .	The State, . . .	W. A. Harlow, Cummington.	W. P. B. Lockwood, Amherst.
Massachusetts Dairymen's Association, . . .	The State, . . .	B. W. Potter, Worcester.	W. P. B. Lockwood, Amherst.
Massachusetts Federation for Rural Progress, . . .	Amherst, . . .	Dr. Kenyon L. Butterfield, Amherst.	Prof. E. L. Morgan, Amherst.
Massachusetts Forestry Association, . . .	Boston, . . .	Nathaniel T. Kidder, 69 Ames Building, Boston.	Harris A. Reynolds, 4 Joy St., Boston.
Massachusetts Fruit Growers' Association, . . .	The State, . . .	I. I. Margeson, Westwood.	F. Howard Brown, Ferncroft Rd., Marlborough.
Massachusetts Nurserymen's Association, . . .	The State, . . .	E. W. Breed, Clinton.	Winthrop H. Thurlow, West Newbury.
Massachusetts Svine Breeders' Association, . . .	The State, . . .	H.-C. Barton, Amherst.	E. L. Qualie, Amherst.
New England Corn Exposition, Inc., . . .	New England, . . .	W. D. Ross, Worcester.	F. L. Weare, Seabrook, N. H.
New England Federation for Rural Progress, . . .	New England, . . .	Elbert S. Brigham, Commissioner of Agriculture, St. Albans, Vt.	James A. McKibben, 177 Milk St., Boston.

New England Federation of Agricultural Students.	New England, .	.	Merle R. Young, Storrs, Conn.
New England Fruit Show,	New England, .	.	F. Howard Brown, Ferncroft Rd., Marlborough.
New England Nurserymen's Association, .	New England, .	.	Daniel A. Clarke, Flakville, Rhode Island.
Southern New England County Fair, . .	Dartmouth, .	.	Charles T. Battey, New Bedford.
Stockbridge Club,	Amherst, .	.	George L. Goodridge, M. A. C., Amherst.
Ware Agricultural and Driving Association, .	Ware, .	.	James E. Kennely, 84 Water St., Ware.
Worcester County Harvest Club,	Worcester, .	.	Mrs. D. A. Howe, 8 Burncoat St., Worcester.

: Deceased.

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